# Automotive Service Digest

*Our 48th year* October, 1960

in this issue . . .

## the FIRST complete, condensed run-down on mechanical changes of the 1961 AMERICAN CARS

For the Story of Mechanical Changes, see page 14

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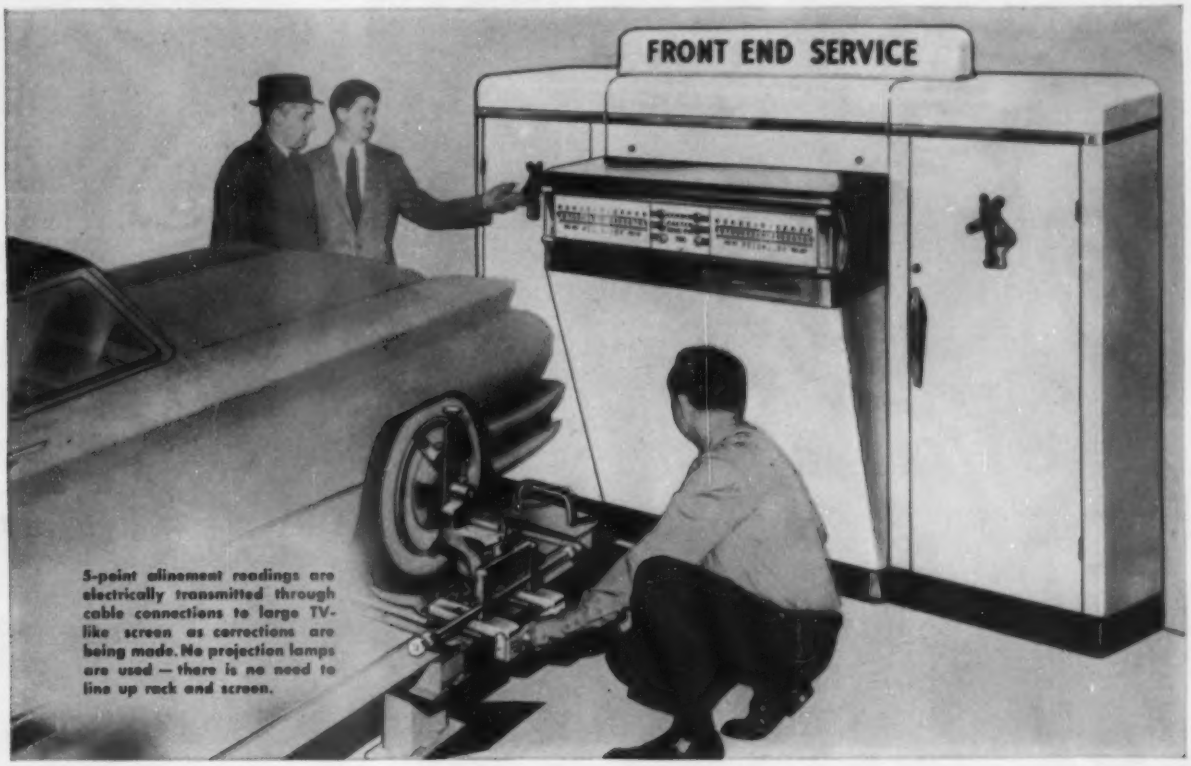
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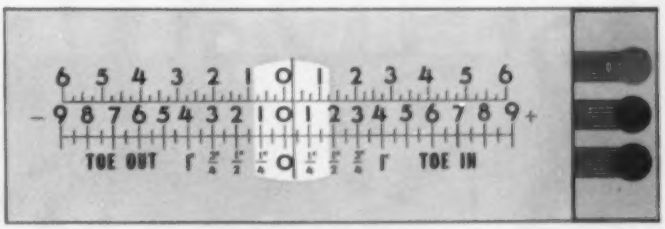


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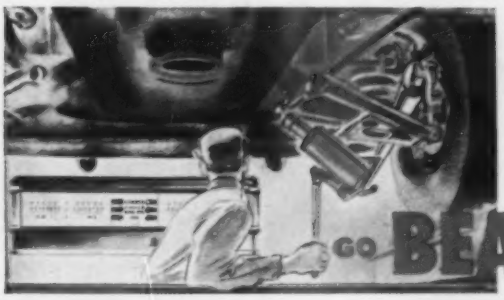


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VOLUME XXXVIII

No. 585

# October 1960

Automotive Service Digest

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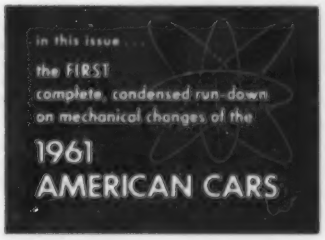
## Cover Subject

No illustrations for this month's cover—just cold type shouting the hot design and mechanical developments which car manufacturers have put into their 1961 models.

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## Technical help for the service shop

***Tech Know-How*** **articles cover how-to and what's new in approved, up-to-date shop practices, as seen and understood by men experienced in the trade.** ***Business Know-How,*** **the dollar-sign side of automotive service work;** ***Service Education,*** **the who-what-where-how of today's trade training.**

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# Automotive clinic

Stuck on some problem? Need help on a job? Write us about your problem on your SHOP LETTERHEAD to insure receiving the information you are looking for. The Automotive Clinic is exclusively conducted for shop operators and others actively in the automotive service business.

Address your letter to Automotive Clinic c/o AUTOMOTIVE SERVICE DIGEST, 900 So. Wabash Ave., Chicago 5, Ill.

Ben Ikert, Editor

## Hard Starting When Hot

We have two 1957 Nash Ambassadors that will not start when they are hot. They act like they have a dead battery or a very draggy starter. We have replaced the starter and solenoid on one, checked starting motor draw and battery, also all connections, but this did no good. We have read all our Nash manuals and cannot find the answer. Wonder if you could give us additional information.—*F.B., Bland, Mo.*

**Answer:** This is a rather tough problem to solve as there are so many causes for hard hot starting. First, check the battery to see that gravity is above 1.250 and after cranking for 15 sec. that the voltage does not drop below 10 volts. Check the compression. All cylinders should be above 130 lbs. Check the starting motor draw to see that it is not above normal. It is possible that the armature is dragging on one of the pole shoes. Check voltage at the battery side of the coil which should be at least battery voltage while the engine is being cranked, and not more than 10.5 when engine is running. If you have an oscilloscope available check the ignition system with it. Check secondary polarity at the insulated spark plug terminals, which should be negative. This can be done by contacting the negative voltmeter lead to a spark plug and grounding the other lead. The meter should swing upscale. If it does not, reverse the coil connections, if the battery is connected correctly.

## Wrong Field Coils

A customer has a 1958 Chevrolet for which the electrical system is not working properly. The first trouble was that the generator would charge the battery, and then not.

We checked the armature and it was in bad condition. The generator was rebuilt, and in 2 weeks the customer was back with a burned up generator. Generator was again rebuilt. Voltage showed too high on a tester and we could not get the correct regulator setting without the voltage being off. What are we doing wrong? *H.M.G., Coon Rapids, Iowa*

**Answer:** From your letter we suspect that possibly you have 6-volt field coils in a 12-volt generator. This would tend to make the fields so strong that the current and voltage could not be regulated by the regulator; that is, the voltage limiter and the current limiter cannot do their work.

To check the fields, insert an ammeter in the field circuit. This will show the field current. Then check this current value against a corresponding field current in a generator that you know to be working satisfactorily in the same model car. We believe you will find that the field current is higher than it should be. There have been a number of cases where 6-volt field coils were used instead of the correct 12-volt coils with the result similar to what you mention.

## Rear Axle Noise

We are having trouble with a 1955 Buick Century rear axle that howls and whines.

I first took out the rear end to replace the pinion bearings, because they were worn and would howl upon deceleration.

I installed new pinion bearings, seals, and carrier bearings and now have a whine or howl when I first start up to 10 mph and from 40 to 55 mph. It is not too loud at either speed but it sounds as though it could get worse.

I took off the back plate and readjusted the carrier bearings and housing. First I loosened them and then retightened them but it did not help. Then I ground the axle spacer to give the axles more end play because they did not have any. That, however, did not correct it.—*D.L.K., Knoxboro, N.Y.*

**Answer:** If the rear axle was noisy before you worked on it, it is quite possible that the adjustment between ring gear and drive pinion was not correct, and possibly it was this and not the bearings that was causing the noise.

There is a shim that goes at the front end of the double row ball bearing to space it properly. If this shim was not in place or the wrong thickness was used it could result in a noisy ring gear and pinion engagement. Also, the ring gear and differential assembly is adjustable from right to left. Unless this adjustment is exactly correct, the gears will be noisy.

To check the way the pinion and gear mesh, brush mechanic's blue on the ring gear teeth and turn the drive pinion. The engagement pattern should show the contact of the teeth to be in the center of the ring gear teeth.

With the possibility of adjustment forward and back of the pinion, and sideways of the ring gear assembly,

*(Continued on page 8)*

**Take advantage of your Automotive Service Digest clinic. Countless other shopmen do—so why not you? Your participation is welcomed.**

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## Clinic . . . *(Continued from page 6)*

you can see that there are many possible adjustments, with only *one* correct adjustment. Depending on what the blue shows up, this will guide you as to what adjustments to make—whether the pinion should be adjusted or whether the correct adjustment can be obtained by adjusting the differential carrier left or right. This will also control the amount of backlash, which should be held to a minimum.

To get a quiet running axle, we would advise you, if possible, to refer to a Buick shop manual and look up the exact specifications for making the rear end adjustments. One cannot be uninformed with this job as the adjustments must be precise. If they are not according "to the book" there will be a noisy rear end. Finally be sure to check the runout of the ring gear which should not exceed .002 in. More runout than this could contribute to a noisy rear axle.

### Gauges on Corvair

I am an automotive instructor and have had quite a few requests for information on the proper installation of gauges on the Corvair. As you well know, there is a problem of long leads, since the engine is in the rear.

What I would like to know is, could the commercially available oil pressure, oil temperature gauges (both mechanical and electrical) also ammeter and voltmeter gauges be used while retaining the tell-tale lights.

I have checked the wiring schematic and it seems that the best place is in series between battery terminal of the voltage regulator and battery positive post.

Any information will be gladly received as I can use it in class and shop work.—*J.E.B., Philadelphia, Pa.*

**Answer:** You cannot use both temperature and pressure gauges with tell-tale lights because the gauge requires a sending unit that gives a voltage proportional to temperature and pressure, respectively, while the sending unit for indicating lights is an on-and-off unit only.

As far as distance from the engine to the dash is concerned, this can be offset by using heavier gauge wire to compensate for the greater length.

We believe if you want a gauge in the electrical system it would be more informative to use a voltmeter than an ammeter, as the voltmeter can be put in parallel with the battery or the generator and will really tell more about electrical conditions than an ammeter. The latter would have to be placed in series. An ammeter connected as you suggest would work, if the leads to and from the dash are large enough to avoid an excessive voltage drop.

### Transmission Pressure

I have recently rebuilt a Powerglide transmission in a repair and maintenance class. I replaced the front pump, clutch and all necessary seals for a good repair job. The primary reason for the overhaul job was a knocking noise in neutral, no pressure after standing overnight and slippage in an accelerated right turn. In the repairing of the transmission itself, I had the help of a trained repairman who has been in business for seven years.

The transmission now operates OK except it still does not have pressure to take off after setting 2 or 3 hrs. without 2 or 3 min. warming-up period. It also slips in a right turn and hesitates after stopping and idling for a few minutes. It only hesitates for a second or two and then engages with a jolt.

My primary concern is the hesitation at stop signs and the slippage in right turns. I have had the transmission to three specialists who cannot find the trouble.

Any information would be appreciated.—*C.D.S., Macomb, Ill.*

**Answer:** In the first place you did not give us the year of the transmis-


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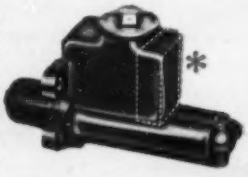

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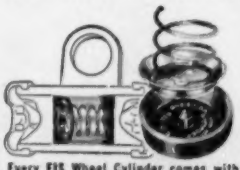

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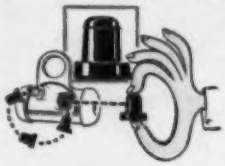

sion model, so it is difficult to give you any specific information.

The first step in running down trouble in this transmission is to get the test specifications and check the oil pressures at each point. If the pressures are all in accordance with specifications, then you will have to check every adjustment and get it within specifications.

We do not see how making right turns can affect the transmission in any way except possibly to shift the oil level due to centrifugal force so that it gets higher on the left side of the transmission and lower on the right side, which might allow one of the oil inlets to temporarily draw in air. However, if the oil level is where it should be this is not liable to happen. We suggest that you again take the transmission to one of the three specialists you mentioned and go through the pressure tests with him.

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## Champagne Paint Problems Often Due to Application

Several inquiries have been made at the factory concerning the matching and refinishing of panels on 1960 cars finished with champagne color paint, code number 97.

Experience has shown that this color can be properly matched with materials available in the field, and that the problem in most cases is one of application, not off-color make-up of the paint.

However, earlier in the year one field source discovered a batch of this color paint that did not meet specifications.

If the paint you have is suspected of being off-color, contact your supplier, as all sources presently have materials that match the production color when properly applied.

## Caddy Oil Filter Gasket

The Cadillac Serviceman bulletin states that when installing a new oil filter element on 1960 cars, place a filter light film of silicone on the top of the gasket. This film will prevent bonding of the gasket to the filter base during operation and will speed up the next oil filter change operation as the gasket will stick to the filter rather than the inside of the base casting.


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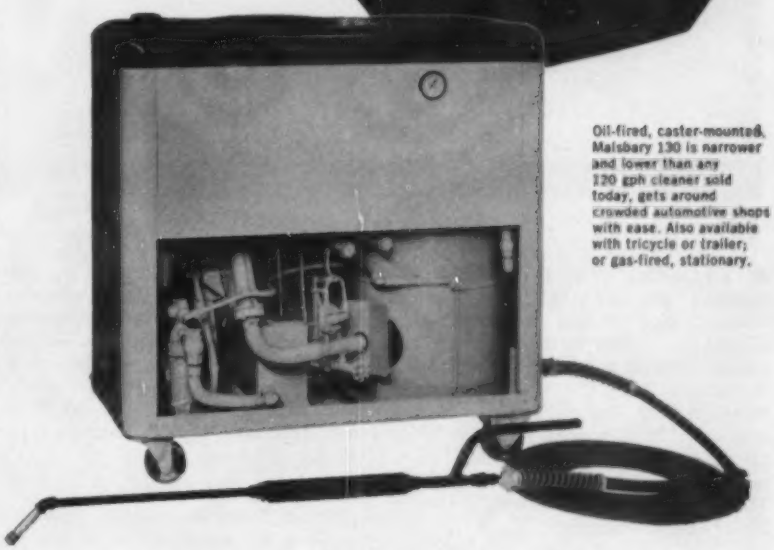
STEAM CLEANER



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By J. EDWARD SCHIPPER
Detroit Editor

# Spokes from the "hub"

• CLOSELY FOLLOWING THE opening show at Cobo Hall, General Motors will present another of its famed Motoramas for its 1961 cars and trucks. The new Motorama will open November 3 at the Waldorf-Astoria Hotel in New York City for a seven-day stay. It then will visit the West Coast for the first time since 1956, appearing in San Francisco January 7-15 and in Los Angeles from January 28 through February 5.

* * *

**Chrysler Corp.** recently conducted a survey on buyers' choice in colors. According to this survey, white is far ahead of any other color and dominates the field. White is the choice of more than 32 per cent of all buyers of Valiants, 23.5 per cent of all Plymouth customers and nearly 24 per cent of De Soto buyers. It runs as high as 38 per cent for Dodge buyers living in the Midwest. Second-choice color preferences run to such hues as Azure Blue, Fawn Brown, and Sky Blue—all light shades. Other choices with prominent showings are lighter tones of blue, grey and brown.

* * *

**Twelve new factory-built** generators will be able to replace well over 200 types that have been used for original equipment and service. They can take care of practically all makes of passenger cars produced in the last ten years and are now being marketed by the Electric Autolite Co.

Included in the new "Universal Generator" offer, according to Karl Chalmers, Service Parts Product Merchandising Manager for Autolite, are seven 12-volt and five six-volt units. They meet replacement problems on most Ford, Chrysler, General Motors and Studebaker cars built in the past decade. Also included are most Willys and American Motors cars produced during the same period.

* * *

**Motor Truck & Coach,** a Canadian trucking magazine, gives an interesting explanation of many mysterious troubles which arise, strangely enough, after the ignition is cut and the engine is stopped. The publication points out that this apparent inconsistency costs fleet operators thousands of dollars in replacing blown head gaskets, warped cylinder heads, scored pistons, etc.

According to this item, the trouble can be traced, in many instances, to a temperature condition which may be called "heat surge". If the engine has been running in heavy service on a hot day, the heat surge is tremendous at the moment the engine is turned off. The only thing which kept the temperature at safe limits while the engine was operating was the flow of coolant coursing through the block and transferring the heat almost immediately to the radiator. When the hot engine is shut off abruptly the all-important coolant circulation stops and the engine heat, still at about the same level as it was when the engine was pulling its heavy load, stays where it is.

Thus it is that for two or three minutes the engine stays at 175° to 200° or higher with no coolant flow to transfer the heat away to the radiator. This wouldn't be any problem if all parts of the engine expanded and contracted evenly and at the same rate but they don't. The resulting variation in dimensions of the parts concerned often produces serious damage.

* * *

**Completion of the** 41,000-mile National System of Interstate and Defense Highways "not later than 1972" was favored in the policy platform adopted by the National Association of County Officials at its silver anniversary meeting in Miami Beach, Fla.

The county officials stated, "The national importance of these roads demands that the Federal Government continue to pay 90 per cent of the costs with the states absorbing the remaining 10 per cent and all maintenance costs. Control of access, separation of grade and other standards carefully developed by the states and Federal Government to meet traffic volumes in 1957 should be scrupulously followed to protect this tremendous national asset."

* * *

**Add to automotive** "publicity stunts" the car which was driven from the front door of the New York World Telegram uptown to the United Nations Building on orange juice. The newspaper man, Bob Fendell, Sports-car Editor of the New York World Telegram and Sun, drove a Rover 3-Litre sedan. No adjustments were made when the Rover's six cylinder engine was switched over to operate on orange-peel juice instead of gasoline. While the run proved that oranges are good, it did not dispute the fact that gasoline is cheaper and better. Although the car got 22 miles to a gallon on this very aromatic fuel, which wasn't bad from the mileage standpoint, the fuel cost $9 per gallon. It required 1,000 California seedless oranges to make the run.

* * *

**A time-saving device** which has been very effective has been introduced by Chrysler in its assembly plants. Magnets have taken the place of pins, clamps and hooks on conveyor lines. By using magnets it is possible to quickly hang parts on the racks rather than to adjust them to hooks, clamps or to thread them into a hanger. The magnets replace 77 different styles of hangers. The permanent magnets handle everything from small trim moldings to 36 lb. floor pans. The major advantage of the magnets is their ability to support parts at any point of contact.

*(Continued on page 76)*

# BALDWIN FILTERS

World's Finest

## "The Inside Story"

Compare Baldwin filters with any others at any price. Prove to yourself Baldwin filters are best . . . highest quality materials, best performance.

Baldwin sets the standard . . . take apart a Baldwin filter. See quality construction . . . Automatic wound cotton, Microlite pleated paper plastic impregnated, Vac-Cel diesel media.

**OIL • FUEL • AIR**

Now you can sell every customer regardless of make or model car, truck, tractor, etc. No dual inventory . . . . over 375 numbers available from your distributor.

Baldwin offers the perfect combination . . . A QUALITY LINE, priced competitively, and that means MORE PROFIT FOR YOU. You can sell the BALDWIN LINE with confidence . . . we guarantee our filter elements. Make sure your customers become repeat customers.

Service station operators and garage owners are finding their customers appreciate a filter that really performs.
Contact your Baldwin distributor. Let him explain famous Baldwin line and sales program. Write for literature and name of distributor in your area.

A.S.I.A.

J. A. BALDWIN Manufacturing Co. Kearney, Nebraska

# Hastings Piston Rings are GENTLE
## ON CYLINDER WALLS

**HERE'S WHY:** Hastings Oil Rings have "wide open" spacers—the most ventilated in the entire industry—therefore deliver more oil to the cylinder walls. The narrow contacts of the steel rails assure positive oil control. Result: adequate lubrication, less wear, longer life for cylinder walls, pistons and rings.

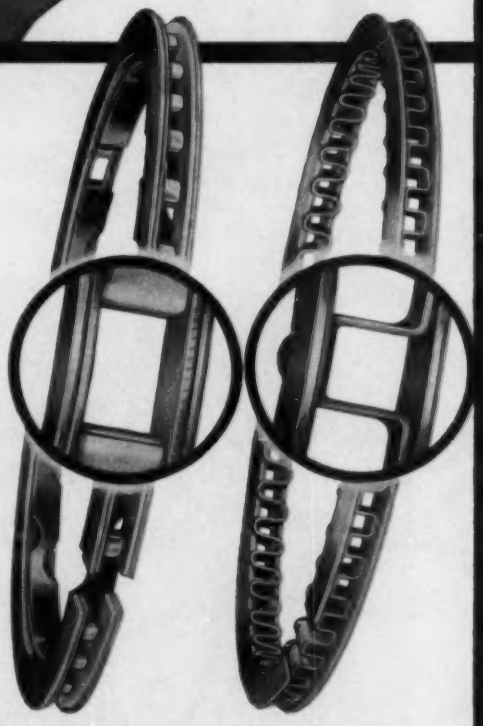
Moreover, the Hastings "shell molding" process of making piston ring iron—a brand new, *different* process—gives you compression rings with more free graphite . . . and graphite is a metallic lubricant. It lubricates the cylinders and provides extra lubrication at the top, where the heat is greatest, and there's the least amount of oil.

This extra protection and longer life for cylinder walls and pistons is coupled with Hastings' established reputation for controlling oil—*completely*. Hastings means no more come-backs . . . better profit . . . and satisfied customers from the start.

**HASTINGS MANUFACTURING COMPANY • HASTINGS, MICHIGAN**
**Hastings Ltd., Toronto**
Piston Rings, Oil Filters, Casite Additives, Spark Plugs

# HASTINGS
## PISTON RINGS

TOUGH on oil pumping • GENTLE on cylinder walls



**steel-vent oil** **flex-vent oil**

In these typical Hastings oil rings, you can see for yourself the ample ventilation that provides efficient drain-back . . . prevents clogging . . . gives lasting oil control.

Hastings Fire-Power Spark Plugs . . . engineered for replacement service . . . give premium performance, at competitive prices, with better profit for you.

# Editor's page

## Designwise and otherwise—the '61 cars have it!

• CARS of the 1960s and the years to come might well be shorter, lighter, less adorned and functionally much improved, if the 1961 models are a measure.

Analysis of across-the-board design applicable to the five major American car manufacturers and close evaluation of recent mechanical developments indicates this could be the case. Revealed is that designers have looked back at some of the good things of earlier cars; have coupled them with many modern technical advances to bring about better vehicles, viewed from every angle.

Inconsistencies of recent years are being abandoned. Thus, the former awkward front door layout referred to in the jargon of the streets as the "dog leg" has disappeared. It obviously was incongruous that motorists could get in and out of compact cars easier than in cars costing much more. The same applied to headroom and to cars that were too long and too wide to get into existing garages of their owners.

There are innovations, too, for 1961. For example, the re-entry of the four-cylinder engine, as in Pontiac's new Tempest. It has been some 30 years that a four-cylinder engine was used in a major American-made production car.

The reader will find on the pages that follow, a host of new, sensible approaches to the manufacture of motor cars in '61 and the years to follow.

In many ways, the new cars reflect the tremendous advances in design, engineering, metallurgy, rubber, plastics and countless other items that go to make up the modern motor car.

For example, more rubber than ever is used in the 1961 cars. Tires, of course, are a large portion, but there are close to 500 other rubber parts in varying sizes and shapes, according to the rubber manufacturers. Also, it is said that an average of 22 lbs. of plastics are used per car, as against 18 lbs. 2 or 3 years ago.

Far greater use of aluminum, in engines and throughout the car, new designs for rear axles, propeller shafts, easier steering on manually steered cars and unitized bodies, are but a few of the many things that enrich the 1961 cars. These, and other mechanical features that highlight the new models are presented on the pages which follow.

Ben Ikert
EDITOR

# American Motors Corp.

**AMERICAN**
**CLASSIC SIX**
**AMBASSADOR V-8**

● RAMBLER LINES for 1961 will comprise, as formerly, three basic models: the 100-in. wheelbase Rambler American, the 108-in. Rambler Six and V-8 models (designated as the Classic series), and the Ambassador V-8 on a 117-in. wheelbase.

All 1961 models in the American Motors line are now equipped with a new ceramic-coated muffler and tailpipe. This is a joint development of the engineers of American Motors, Walker Mfg. Co., and the Bettinger Corp. The coating is fused to the muffler and tailpipe at a temperature of 1500° F. and is resistent to acids and other corrosive condensates which collect in mufflers and tailpipes. The life of the ceramic armored muffler and tailpipe will be guaranteed to the original owner as long as he owns the car, according to American Motors.

An all-new vacuum-powered 4-door locking system is offered as a factory installed option on all models of the 1961 Rambler Classic Six and V-8 lines. The system incorporates several units in each door controlled by an on-off switch located on the underside of the instrument panel. There is also a seat valve mounted on the underside of the driver's seat which serves as a safety mechanism so that the doors cannot be locked unless the driver is seated. The new feature provides locking of all doors by the driver.

The Weather Eye heating and ventilating system has been completely redesigned to provide more efficient heating and more effective distribution of fresh air. The system is augmented by two separate fresh air ventilators which bring fresh air directly into the passenger compartment without passing through the restricting channels of the heating system. The outside air intake is located on the cowl. Each vent is separately operated.

The All-Season air-conditioning system also has been completely redesigned. For faster, more efficient cooling the system has its own 3-speed blower and air passages that are completely separated from those of the heater system. This is claimed to increase the flow of cold air by approximately 10-15 percent. The 3-speed blower is located in the engine compartment to minimize noise transfer. Adjustable cold air outlets are centrally located on top of the instrument panel.

## *Rambler American*

● THE RAMBLER AMERICAN has been restyled, giving it new, crisp-flowing lines. A convertible and 4-door station wagon have been added to the line which also includes 2-door station wagons and 2- and 4-door sedans.

The 100-in. wheelbase Rambler American is 5.2 in. shorter and 3 in. narrower than last year's model, but retains interior room for six persons. The size reductions were made possible by reducing the front and rear over-hang and by slimming down the side panels. Usable trunk space has been increased 50 percent to 23.8 cu. ft.

The car is offered with a choice of two engines and three transmissions with standard axle ratios to provide economy and performance. High-performance axle ratios are optional at no extra cost.

*1961 Rambler Classic Six four-door sedan on a 108-in. wheelbase. It features a new six-cylinder engine with die-cast aluminum block.*

*Rambler American two-door convertible for 1961. It is equipped with electric-hydraulic top of white or black vinyl.*

*New front end treatment of the Ambassador V-8 includes an aluminum grille. Car is available in 4-door models and station wagons.*

The 125 hp. overhead valve Six is standard on all Custom and optional on Super and DeLuxe models. The L-head Six of the Super and DeLuxe models is rated at 90 hp. and is also a Standard choice.

An improvement on the 125-hp. Six is the water heated intake manifold cover to provide quick warming of the air-fuel mixture. An improved carburetor is used. Both engines have larger camshaft bearings and the crankshafts have been redesigned for smoother operation.

The 1961 American's have suspended brake and clutch pedals which require less foot pressure and eliminate holes in the floor boards. This change also allows a more accessible brake master cylinder in the engine compartment. Power brakes and power steering are options for 1961. The 1961 models offer better vision on all sides, due to an increase in glass area. On the 2-door sedan, for example, the glass area is 2,819 sq.in., a gain of 71 sq.in., over the 1960 models. On the 2-door wagon, the increase has been 409 sq.in.

## Rambler Classic Six

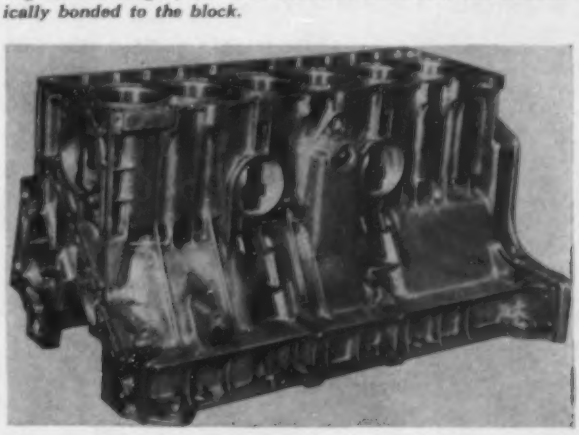
● THE RAMBLER CLASSIC SIX features the introduction of a new 6-cylinder engine with a die-cast aluminum block. The new engine weighs 80 lbs. less than the comparable 1960 cast iron engine.

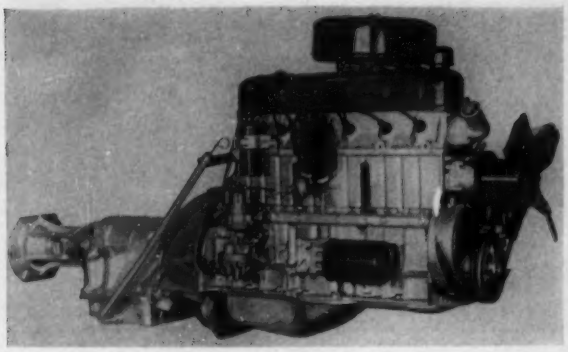
This method of manufacturing the block has been under development by American Motors for the past 6-years. The die-cast block is made of special aluminum-silicon alloy for hardness and controlled temperature expansion.

Centrifugally cast iron cylinder liners are chemically and mechanically bonded to the block. During the development stage the aluminum blocks were exhaustively tested by aircraft industry methods of using cemented plastic with polarized light to establish static and dynamic stress points. Other changes in the engine include the use of hydraulic valve lifters, a newly designed oil pump which eliminates the possibility of hydraulic lock and provides exact pressure calibration. A full flow oil filter is standard equipment.

Other detail improvements include a re-designed intake manifold for increased fuel-air velocity and a completely counter-balanced crankshaft. Horsepower of the Rambler Classic Six remains at 127.

*Aluminum die-cast block of 1961 Rambler Classic six-cylinder engine. Centrifugally cast-iron liners are chemically and mechanically bonded to the block.*





*Horsepower of the Rambler Classic Six is 127 at 4200 rpm. Optional version with dual carburetor gives 138 hp.*

The V-8 engine is rated at 200 hp., with power pack options available for both this and the Six. Regular grade gasoline is recommended for all models.

While the basic lines of the Rambler have been continued, a number of changes have been made in appearance. The headlights have been lowered and incorporated into the design of the lattice work of the aluminum grille. Detail changes in sculptured lines introduce a fresh styling note in the 1961 Rambler while preserving the continuity of appearance which has distinguished American Motors products. Molded fibreglass ceiling panels give improved noise suppression, better retention of shape and resistance to soil. The new material is also fire-proof and water-proof.

Redesigned front shock absorbers incorporate a rebound hydraulic cut-off system for improved riding and less tendency to hit bottom. Four-way windshield washer nozzles provide a more efficient water spray pattern. Improved ignition results from the use of high-tension wiring of the new carbon-core type.

There are eight 4-door models in the Classic Six and six in the Classic V-8 lines. They include sedans, 2-seat station wagons and the 3-seat station wagon introduced last year. Captive air tires are standard on the 3-seat wagons and optional on other models.

Rambler continues its reclining seats which can be made into twin beds as an option. Also optional are individually adjustable front seats which permit the passenger to move the seat forward or backward without interfering with the driver seat position. Optional also are the headrests of last year.

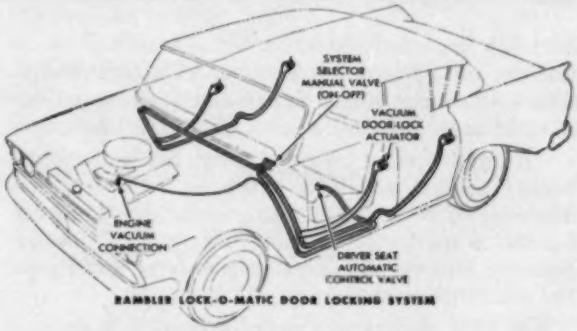
The 127 hp. Six has a compression ratio of 8.7:1 and a displacement of 195.6 cu. in. The torque rating is 180-lb. ft. at 1600 rpm. The V-8 engine is rated at 200 hp., with a compression ratio of 8.7:1, piston displacement of 250 cu. in. and torque of 245 lb. ft. at 2500 rpm.

*Standard equipment on all 1961 Rambler models is a new ceramic-armored muffler and tailpipe system.*

## *Rambler Ambassador V-8*

● THE 1961 RAMBLER AMBASSADOR V-8, American Motors' compact luxury car, is featured by new exterior styling and several engineering improvements. Built on a 117-in. wheelbase, the Ambassador V-8 is available in six 4-door models, including a super and custom sedan, super and custom 2-seat station wagon and super and custom 3-seat station wagon.

The Ambassador is powered by a 250 hp. V-8 engine, equipped with a twin-barrel carburetor. It has a compression ratio of 8.7:1, a displacement of 327 cu. in., and a bore and stroke of 4" x 3¼". It is designed to operate on regular grade gasoline. In addition, there is an optional 270 hp. engine of the same dimensions but with a 4-barrel carburetor, a compression ratio of 9.7:1 and a dual exhaust system.


SYSTEM SELECTOR MANUAL VALVE (ON-OFF)
VACUUM DOOR-LOCK ACTUATOR
ENGINE VACUUM CONNECTION
DRIVER SEAT AUTOMATIC CONTROL VALVE
RAMBLER LOCK-O-MATIC DOOR LOCKING SYSTEM

*All new vacuum powered four-door locking system, factory installed option on 1961 Rambler Classic Six and V-8 lines.*

Three transmissions are available. The Flash-O-Matic automatic transmission, operated by push-button system, is optional. Optional over-drive and standard synchromesh are also available.

A number of engineering improvements are found throughout the chassis and body. The front shock absorbers are redesigned to incorporate a rebound hydraulic cutoff for improved ride control. The improvement is designed to eliminate rebound bumpers and brackets, thus permitting more wheel travel over rough roads. This is claimed to substantially reduce "bottoming."

On cars shipped to California, there is a special crankcase ventilating system to comply with Cali-

(Continued on page 80)

# ROBERT BOSCH Means Business with this new plug sales kit

ROBERT BOSCH starts a big, long-range drive right now to step up your plug profits. Kicks off the campaign with this bang-up new sales kit loaded with eye-appeal, buy-appeal "selling tools" for shop, window and counter.

Thermo-elastic plugs are tops for performance because they adapt their working temperatures to every driving condition. Cash in on the built-in demand for replacement with ROBERT BOSCH on imported cars, largely factory-equipped with thermo-elastic—and on the ever-increasing market on domestic cars and engines, too.

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**thermo-elastic**
**SPARK PLUGS**

the plugs that adapt their working temperatures to every driving condition

*

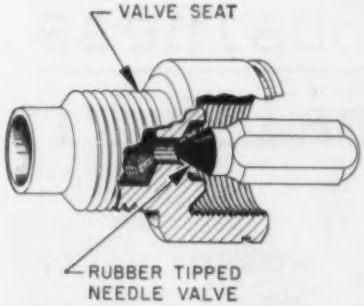
# Chrysler Corporation

**CHRYSLER**
**DE SOTO**
**DODGE**
**PLYMOUTH**
**VALIANT**

*Chrysler's Newport 2-door hardtop powered by a 361 cu. in. engine. Wheelbase is 122".*

• CHRYSLER CORP., meeting the greater emphasis on lower cost luxury motoring, is introducing an entirely new economy line—the Newport. The Saratoga series is discontinued. The Chrysler Newport features a new heavy-duty manual transmission as standard equipment and a 361 cu. in. engine designed for economical operation on regular grade fuels.

The 1961 Chrysler line comprises 15 different models in four series: Newport, Windsor, New Yorker and 300-G which succeeds the 300F. The Newport and New Yorker series have 5 body styles: 4-door sedan, 4-door hardtop, 2-door hardtop, convertible coupe and 4-door hardtop station wagon. The Windsor has three body styles: 4-door sedan, 4-door hardtop and 2-door hardtop. The 300-G is available as either a convertible or a 2-door hardtop.



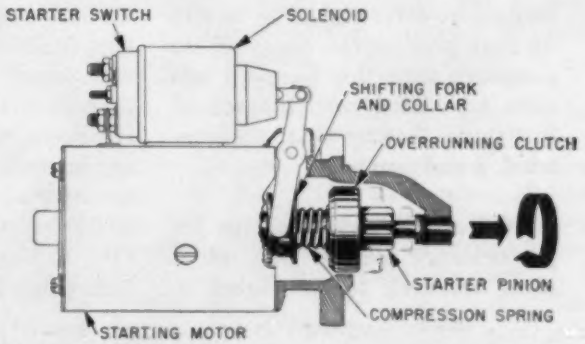

*On all Chrysler Corp.-made cars a rubber tipped needle valve provides protection against flooding due to dirt, etc. Foreign particles are imbedded in the rubber.*

The Newport, the current addition to the line, has a 122" wheelbase as has also the Windsor, which in the 1961 series, is 4" shorter than the 1960 version which had a wheelbase of 126". The New Yorker and the 300G continue the same wheelbase as last year. The New Yorker retains its name but the 300-G succeeds the 300-F of 1960.

Both the Newport and Windsor have 61" treads front and 59.7" rear. The New Yorker and the 300-G have 61.2" front and 60" rear. All four series have 60° V-8 engines.

The Newport has a bore and stroke of 4.12" x 3.38" giving a displacement of 361 cu. in. The Windsor has bore and stroke of 4.25" x 3.38", which is a change from 1960 when the dimensions were 4.03" x 3.75". The Windsor displacement is now 383 cu. in. Both the New Yorker and the 300-G engines are 4.18" x 3.75" with displacement of 413 cu. in. 2-barrel carburetors are used on the Newport and Windsor and 4-barrel on the New Yorker and 300-G. Regular fuel is recommended for the Newport but the Windsor, New Yorker and 300-G call for premium fuel. The reason for this is that while 9.0:1 compression ratio is used on the Newport, the compression ratios on the other series are presumably higher, although not available as this is written.

It is noted that in the case of the Windsor engine,

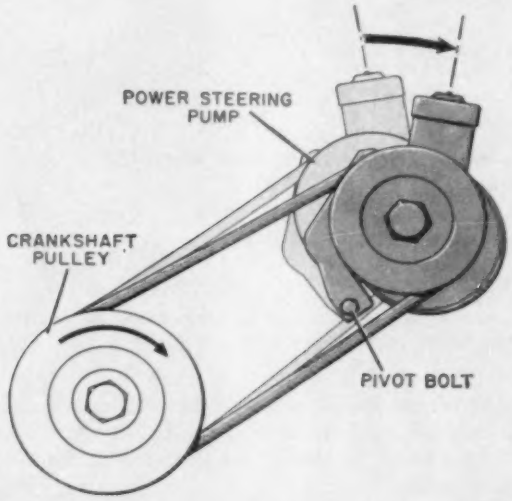



*The new solenoid shift starting mechanism which is standard on all 1961 cars built by Chrysler.*

*Appearancewise the 1961 Chrysler Imperial features free standing headlamps, reminiscent of former days.*

although the bore and stroke have been changed as compared with 1960, the displacement remains identical to that of the 1960. The pistons now travel a shorter distance for a given rpm because of the .37" shorter stroke which is claimed to result in an engine that has higher mechanical efficiency and greater economy. As in many other models in the Chrysler Corp. lines a slight reduction in compression has been offset by increasing the diameter of the intake valve for better breathing. On the Windsor engine the intake valve has been increased from 1.95" to 2.08".

Improved driving characteristics have resulted from two carburetor refinements. One is common through all Chrysler Corp. lines—the rubber-tipped needle valve in the carburetor float bowl which makes the unit less sensitive to flooding caused by dirt. The other technical feature is a 2-stage step-up jet which provides more precise metering of the fuel at cruising speeds and results in smoother engine operation.



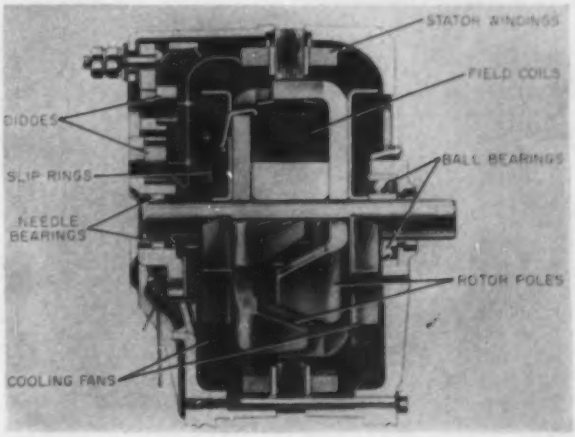

*Throughout its line of cars, Chrysler Corp. uses this self-tightening drive on the power steering pump.*

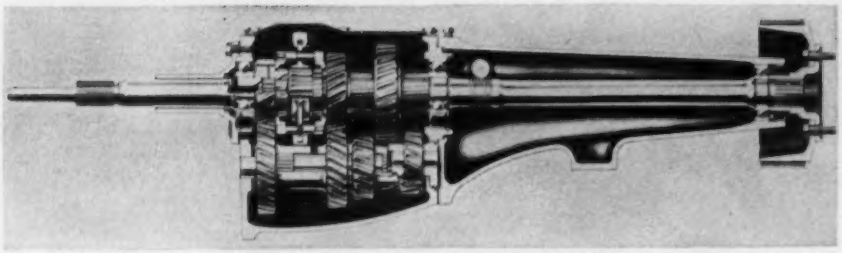
An ignition feature on the complete line of Chrysler Corp. cars is the use of an aluminum distributor manufactured by Chrysler's newly developed electrical equipment division. In addition to the aluminum housing, the distributor also utilizes new lighter-weight nylon contact breaker points. The nylon is incorporated in the movable contact as pivot bearing material and in the rubbing block. It is claimed that nylon's self-lubricating properties make it ideal for this type of application. It's light weight and hence lower inertia is claimed to minimize breaker point bouncing at high engine speeds.

Chrysler big car lines, as well as the smaller ones have a closed crankcase ventilating system installed on all cars intended for sale in California. The object of the system is to reduce the emission of hydrocarbons which might contribute to smog conditions. The system routes crankcase vapors into the intake manifold where they pass into the cylinders and are burned.

The 1961 Chrysler heavy-duty manual transmission is standard on the Newport and available upon special order for the Windsor. It features a 2.55:1 low ratio gear, 1.49:1 second gear and 3.34:1 reverse gear. Gear changing is accomplished through a sports car-type, floor mounted shift lever. All gears are helical for quiet operation and second and third gears are synchronized for smooth shifting. The transmissions available on all four series are of the torque-converter type with a nominal diameter of 12.5" and a stalled torque ratio of 2.2. Rear axle ratios on the Newport, Windsor and New Yorker are 2.93:1 with automatic transmission and with manual shift ratio is 3.58:1 and 3.23:1 on the 300-G. The manual transmission is standard on the Newport and available upon special order only for the

*Used on all 1961 Chrysler Corp. cars is this alternator which supplies more current at low-speeds and weighs 8 lb. less than the generator.*





*Three-speed heavy duty, manually operated Chrysler-built transmission. The "long second" is a versatile gear for traffic or mountain driving.*

Windsor. It is not available on the New Yorker or 300-G.

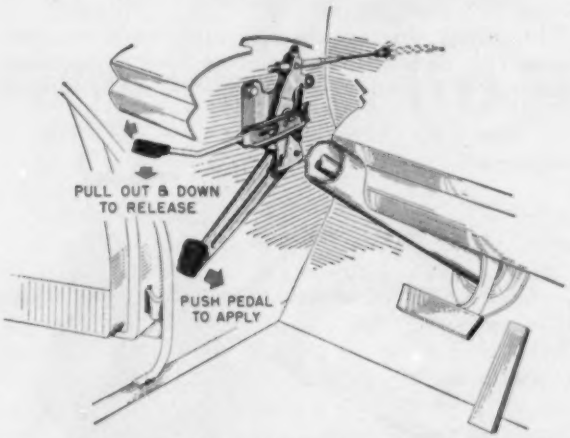
The Chrysler-built alternator, common to the corporation's complete line, is standard equipment. This unit, which delivers more current at low speeds to supply heavy electrical demands, has an electrical capacity suited for today's amperage requirements.

Throughout all Chrysler lines also is a fabric reinforced rubber coupling between the steering components. This feature replaces the wedge method of adjustment used in 1960.

In addition to the needle bearing cross-shaft, which was introduced in Chrysler steering last year, the manual steering gear now has needle thrust bearings on both ends of the cross-shaft roller. These reduce friction between the roller and restraining bosses, further improving smoothness.

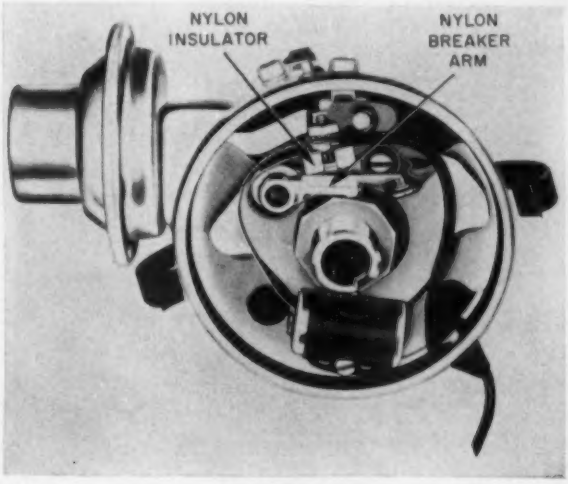
With power steering there is a self-tightening drive for the steering pump to increase belt tension in proportion to the pump drive torque requirements. This also is a common improvement across Chrysler lines and similarly, the Chrysler parking brake has been adopted across the board for all Chrysler-built cars. The brake release lever is pulled toward the driver and then pushed down before the brake can be released. This added motion further reduces the possibility of inadvertently releasing the parking brake by accidentally striking the lever. Another piece of Chrysler equipment used throughout all lines is the Oriflow-type shock absorber. These have been somewhat re-designed for quieter operation, the seat of the base valve having been made narrower and the grooves shallower.

The 300-G series is the American equivalent of the European Grand Turismo cars. It is designed throughout for superior road qualities. It features a heavy-duty version of the Chrysler Torsion-Aire suspension. Suspension rates are increased 40 per-




*Incorporated in 1961 Chrysler car engineering is the step-on parking brake for easier and safer application.*

*The new 1961 Chrysler-built distributor has an aluminum housing and nylon breaker points to resist point bouncing and prolong life.*




cent above the standard to provide a level and stable ride over all road surfaces. The Oriflow-type shock absorbers are also specially calibrated to minimize bounce and rebound.

On the 300-G the wheels and tires are designed specifically for high-speed operation. New 8.00 by 15 tires on 6" rims have replaced the previous 9.00 by 14 size. These are nylon cord tires and designed to be suitable for continuous operation up to 125 mph. The 15" rims have been selected in order to provide improved cooling air flow over the 12" brake joint drums. Standard on this car is the 413 cu. in. engine equipped with high-performance camshaft and ram induction manifold. Also included is the heavy-duty Torqueflite transmission. A 3-speed floor shift manual gear box is available on special order.

*(Continued on page 26)*

# Winter Checkup Profits Depend on the Plans You Make Right Now

Cold weather is on the way. And that means the big profit season for both service and parts—**if you make the proper plans—MoPar plans!**

First, make sure **now** that your shop is adequately staffed so it can handle an extra volume of service work. Because MoPar replacement parts install so quickly and easily, your service men can do more jobs, make customers happy, keep profits up.

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Make your plans for the winter season right now. Get on the phone and call your MoPar Wholesaler or your Valiant, Plymouth, Dodge, De Soto, Chrysler or Imperial Dealer. He'll work with you to help turn your plans into profits!

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Here's an opportunity to focus attention on your name as well as the time—24 hours a day—with this easy to attach name plaque. Extra plaques are available at $1.65—with original order. Plaque order form is packed with the SPM-72 promotion package.

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# Personalized* Fire-Ring Clock

***Draw attention to the time . . . time for a new set of AC Fire-Ring Spark Plugs***

Clock watcher or not — everybody wants to know the time of day. That's why a clock, prominently displayed is a top attention-getter. And when that clock is surrounded by a circle of fire, as in this top quality AC clock, you'll draw even more attention to the sale of AC Fire-Ring Spark Plugs. It's a big 16 inches across — with a face that's fully illuminated for round-the-clock viewing. A specially designed light, built into the clock, throws illumination to the rear providing a safety light at night. Display it in your front window — in a lube bay — anywhere. It's easy to hang. And it costs so little. Read the special offer and order your AC Fire-Ring Clock today!

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**COLORFUL WINDOW TRIM DIRECTS MAXIMUM ATTENTION TO THE FIRE-RING CLOCK AND AC SPARK PLUGS**

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AC **SELLING *SLANTS***

MONEY-MAKING FACTS

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## THIS HANDSOME TABLE RADIO IS YOURS WITH THE OFM-73 PROMOTION PACKAGE

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When you sell the six fast-moving AC Oil Filters in the package, you recover $17.85 — the entire cost of the promotion package.

**ORDER OFM-73 FROM YOUR REGULAR**

# OF THE MONTH ! AC

# DEAL IN TOWN !

***AC Triple-Trapper Oil Filters —are three ways better:***

(1) They are made with stronger filtering material, (2) provide more usable filtering area, and (3) have greater trapping capacity. They are used on more new cars than any other brand.

## Use This Colorful Window Trim to Sell More Oil Changes and Filters

This eye-catching window trim comes with one AC Bop-Ball for display purposes. Put this window trim in a prominent spot to take full advantage of its tremendous sales building potential. AC Bop-Balls make an ideal bonus gift to customers for oil and filter changes, plus other service specials.

### "PUNCH UP" PROFITS WITH AC BOP-BALLS

You can order all the AC Bop-Balls you want in lots of 10 for $4.00. Have plenty on hand for your customers — be ready for the extra sales and profits that can be yours — with the fun-filled Bop-Ball as oil and filter sales builders!

**AC SUPPLIER TODAY**

## DeSoto

*Aerodynamic advantages are claimed for the new styling of the 1961 DeSoto. Concave design of quarter panels is said to achieve stability in cross winds.*

● SOME REDUCTION in compression is noted on the 361 cu. in. V-8 DeSoto engine, which now has 9:1 for better handling of standard gasoline. It is claimed, however, the performance is undiminished, even with lower compression since the intake valves have been enlarged for better volumetric efficiency.

Other changes in DeSoto and typical of all Chrysler Corp. lines are quieter, shock-proof steering system, nylon rubbing block on the breaker arm in the distributor, quieter shock absorber action, magnetic speedometer drive, new under-hood silencing pad and refined parking brake.

From the standpoint of appearance, the car has a new silhouette. The mass at the rear of the car has been reduced and the hood lengthened. A minimum of side trim is employed. Aerodynamic advantages are claimed for the styling in that the center of gravity of the car and the center of lateral air pressure are closer together. This is claimed to reduce wind drag and give greater stability in cross-winds. DeSoto engineers also claim the concave design of the rear quarter panels also help to achieve stability when driving in cross-winds.

## Dodge Dart

● THE DODGE DART, a newcomer in the low-priced field in 1960 is continued for 1961 with a number of changes and refinements. Continued is the practice of offering a choice of four engines. All standard engines will operate on regular grades of gasoline.

Starting from the economy side, the Slant 6 has had the compression reduced from 8.5 to 8.2 to give the engine greater tolerance on the lower octane ratings of regular grade gasoline. This engine has a displacement of 225 cu. in. The bore is 3.40" and the stroke 4.125".

Next in the engine line is the 318 cu. in. V-8. This engine was introduced last year and is again offered in 1961. This is the Standard Dart V-8, equipped with a 2-barrel carburetor with a 4-barrel camshaft and valve spring dampers.

Optional for Dart models is a new, high-performance version, with 361 cu. in. displacement. This V-8 engine has a 4-barrel carburetor. Compression ratio is somewhat lower than last year and is down to 9:1 to permit use of regular gasoline. For high-performance, there is an optional 383 cu. in. V-8, equipped with ram induction manifolding and dual 4-barrel carburetor. It has dual exhaust, a special camshaft and valve spring dampers.

Two carburetor changes have been made for 1961 on all Dart engines, except the ram induction package, to provide improved performance. A 2-stage step-up jet gives smoother part throttle performance and finer mixture control.

An emission control consisting of a closed crankcase ventilating system is installed on all Darts destined for use in California. The system consists of a special carburetor, a spring loaded valve mounted on a steel cylinder on the rocker arm cover through which the crankcase gases are normally vented, and a flexible tube connecting valve and carburetor. This system routes crankcase vapors into the intake manifold where they pass into the cylinders and unconsumed products are burned.

The solenoid shift starter is used on all V-8's.

*The 1961 Dart offers three, four-door station wagon models in the Seneca and Pioneer lines.*

This solenoid shift starter was previously used on more expensive Chrysler products. Turning the ignition switch energizes a solenoid at the top of the starting motor, driving a plunger which activates the shifting regulator. Completing its travel, the plunger closes the switch and the starting motor revolves. Should the driver hold the key in start position after the engine fires, an over-running clutch protects the starter armature.

The heavy-duty manual transmission is standard equipment with 361 and 383 cu. in. V-8s and heavy-duty taxi packages. Entirely new, its helical gears are synchronized in second and high. Gear back-lash is reduced by envelope splines on the main shaft.

For 6-cylinder engines the manual transmission has new gear ratios of 2.71 in low and 1.83 in second, compared with 2.50 and 1.68 last year.

A light-weight manual transmission for the 318" Dart V-8 has one-piece cast iron case, blocker-ring synchronizers and short, stiff shaft. Gear ratios are 2.12 for low; 1.43 for second and 2.37 for reverse. Gears are shot-peened.

Suspension remains the same as last year, except the six cylinder Dodge Darts now have five leaves in the rear springs instead of four. The additional leaves provide longer life without altering the load-carrying capacity or changing the drive characteristics. The shock absorbers, Oriflow-type, are quieter in operation. The base valve seat is narrower and its grooves are shallower, thus reducing the force needed to open the valves smoothly and quietly.

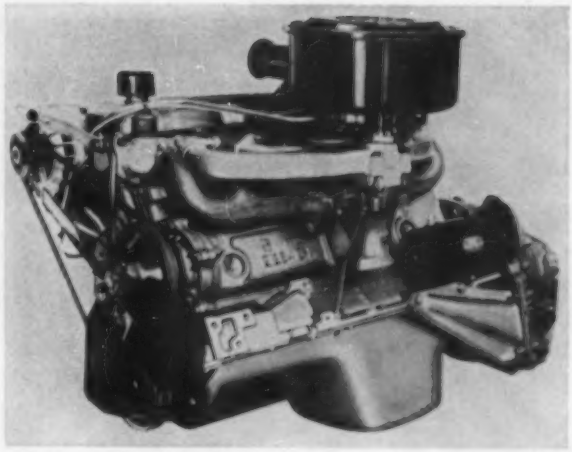
#### BASIC BODY DESIGN RETAINED

In the matter of appearance, Dart stylists have given the 1961 Dart a new look, although the basic body design is retained. Extensive changes have been made in the hood, fenders, quarter panels and deck. The model designations are as follows:

The Dodge Dart V-8-Seneca consists of a 4-door sedan; 2-door sedan; 4-door stationwagon (6-passenger); 4-door stationwagon (9 passenger). Phoenix: 4-door sedan; 2-door hardtop; 4-door hardtop; convertible coupe.

The Dodge Dart 6-cylinder line: Seneca: 4-door-sedan; 2-door sedan; 4-door stationwagon (6 passenger). Pioneer: 4-door sedan; 2-door sedan; 2-door hardtop; 4-door stationwagon (6 passenger); 4-door stationwagon (9 passenger). Phoenix: 4-door sedan; 2-door hardtop; 4-door hardtop.

A wide range of optional equipment is offered for Dart cars. Factory installed are: air-conditioning, closed crankcase ventilating system, electric clock, sure grip differential, heater and a complete line of accessories. In addition, dealer installed options include Auto Pilot, automatic beam changer, rear window de-fogger, emergency flasher system, underhood light, gas cap lock, rear door safety locks, Mirror-Matic automatic dimmer mirror, vanity mirror, seat belts, padded sun visors, stationwagon tailgate window screen and tinted plexiglass sun visors.



*Dodge Lancer engine for 1961 has a piston displacement of 170 cu. in., compression ratio of 8.2 and single-barrel carburetor matched for regular fuel.*

## Dodge Lancer

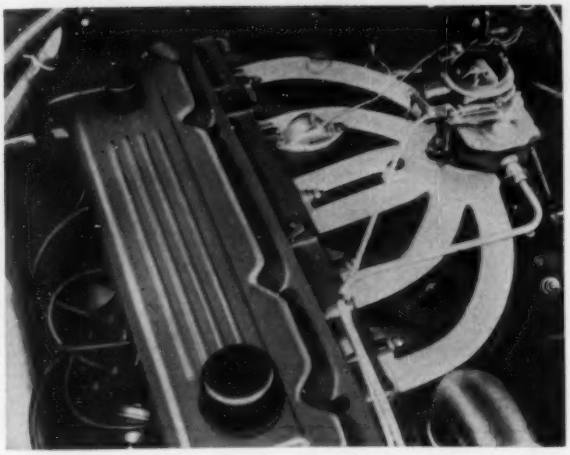
● THE DODGE LANCER introduced for 1961 enters the compact car field with a wheelbase of 106.5" and overall length of 184", width of 70.4" and a height of 53.3". Although this is a compact car, it has 6.2" road clearance as compared with 5" for the Dart, has more head room in front by .3" than either the Dart or Polara and only ½" less in the rear.

Although the Lancer is the lowest priced car in the Dodge line, it incorporates many of the Chrysler Corp. engineering features common to all lines for 1961. The 6 cylinder Lancer engine is similar to the engine used in the Valiant and, of course, incorporates all of the improvements which have been made in the Valiant power plant for 1961. It is a 170 cu. in. slanted Six, with overhead valves and a cast iron block. It has a compression ratio of 8.2:1, with a horsepower rating of 101 at 4400 rpm and a torque rating of 155 lb. ft. at 2400 rpm.

Standard carburetor is a single-barrel type and designed to be used with regular grade fuel. The sump pump requires only 4 quarts of oil and the cooling system takes 14 quarts of water. Bore and stroke of the engine are 3.4" x 3.125", respectively. The intake system on this engine is unique, consisting of six, long-curved tubes reaching from the one barrel down-draft carburetor to each of the cylinders.

The camshaft is mounted high in the engine block and is driven from the crankshaft sprocket by a silent timing chain. The push rods are tubular, operated through solid tappets. Stamped steel rocker arms contain self-locking screws for adjusting valve clearance. Umbrella-type seals are fitted to the valve stems for oil control, and four-bead valve locks are used on the exhaust valves to promote free rotation and long life. Valve diameters are intake 1.62", exhaust 1.36".

The engine mounting employs rubber "sandwiches" which isolate the vibrations of the engine



*The Lancer intake manifold consists of six, long curved tubes reaching from the one barrel carburetor to each of the six cylinders.*

and drive frame from the chassis, contributing to silent operation. The rubber sandwiches are rubber bonded to steel plates.

The crankcase breather is designed also as a partial control of exhaust fumes by automatically returning all fumes through the carburetor and into the combustion chamber. A newly designed flow control valve regulates the amount of fumes fed to the manifold. No crankcase fumes are released to the atmosphere. Mechanism for controlling the flow is a spring-loaded valve which is operated by a manifold vacuum.

### TRANSMISSION 100 LBS. LIGHTER

The 3-speed automatic Torqueflite-6 transmission used in the Lancer car weighs 100 lbs. less than the automatic transmissions used on other Dodge units. The design includes a parking pawl, located in the transmission extension. This is actuated by a cable connected to a sliding lever placed just under the transmission push-button on the left side of the dash-mounted instrument cluster. This pawl locks the transmission output shaft to the aluminum extension housing and is used to hold the car in a parked position. The torque converter and transmission are encased in a one-piece, die-cast aluminum housing. The ratios are as follows: first, 2.41; second, 1.45 and third 1.00 and reverse, 2.20. The standard rear axle ratio for cars with this transmission is 3.23.

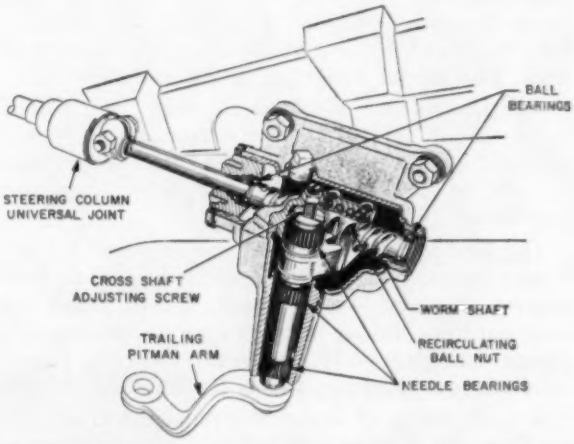
The Lancer manual transmission is a 3-speed gear box inclined 30° to the left to provide linkage space within the low, narrow tunnel. The gearshift lever is a short floor mounted unit. A torque shaft between the transmission and gearshift lever prevents engine vibrations from reaching the hand. Blocker-ring synchronizers on second and third gears prevent clash. This clutch is a standard dry-plate type, with a diameter of 9.25". An optional 10" diameter clutch is offered for heavy-duty work. The gear ratios in the manual transmission are: first, 2.71; second, 1.93; third, 1.00 and reverse 3.49. The standard rear axle ratio with this transmission is 3.55.

Power steering is a low-ratio, fast-response system with a ratio of 15.7:1. The hydraulic power is provided by a vane-type, belt driven pump. One V-belt drives the water and power steering pumps while the other drives the alternator off the power steering pump.

The Lancer Torsion-Aire front suspension is similar to that used on other Dodge models. The rear is a leaf spring system. The steering linkage uses anti-friction bearings throughout and the manual steering ratio is 20:1. The curb to curb turning circle is only 37.1 feet. The steering geometry is so arranged that when the steering wheel is turned, the pitman arms and the steering knuckle arms all swing through similar arcs in the same direction. The advantage claimed for this is that the effort required to turn the wheels near the limits of angular travel is only slightly more than that required to turn through the center.

An option on the Lancer is an air-conditioning unit which is similar to that used on the 1961 Dodge. This unit is dealer installed. The evaporator unit and controls fit under the center of the dash. There are two controls for the driver, air temperature and blower speed.

Unit body construction is used. Box members in the underbody absorb driving, braking and suspension loads. Certain structural components which are subject to collision-type accidents are bolted on to facilitate servicing and to reduce the cost of repairs for this type of damage. Full sound insulation is applied to firewall, roof, panel and underbody and rear shelf panel.




*The ratio of 20 to 1 on the Lancer manual steering gear provides a balance between steering ease and quick response.*

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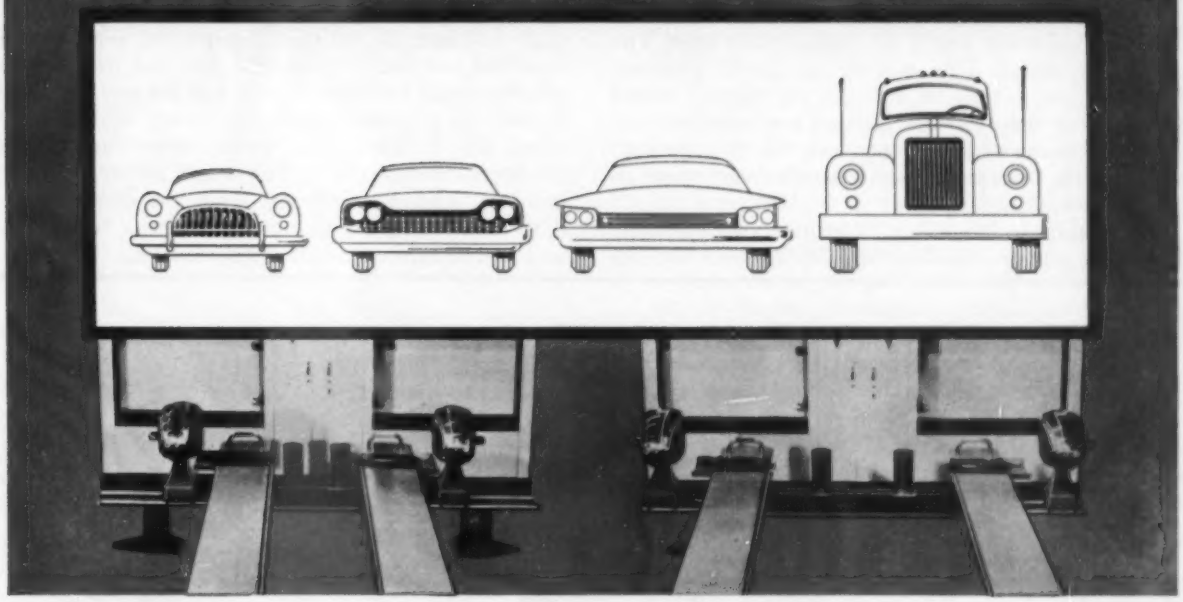

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## Dodge-Polara

● THE DODGE TOP LINE for 1961 is the Polara, designed as a luxury car in the medium-priced field. The Polara is offered only in one 122" wheelbase series. There are six models: 4-door sedan, 2-door hardtop, 4-door hardtop, convertible, 4-door (6 passenger) stationwagon, and 4-door (9 passenger) stationwagon. Notable changes have been made in appearance and there is a definite increase in the amount of glass area improving driver vision in all directions.

The standard Polara engine is a 361 cu. in. with a 2-barrel carburetor and a 9:1 compression ratio. The engine is designed to use regular grade gasoline. The 361 cu. in. engine follows the pattern noted throughout the Chrysler lines, where compression ratio has been reduced, but intake valves have been enlarged to improve volumetric efficiency through greater breathing capacity.

In addition to the 361 cu. in. engine, two high-performance power plants are offered. The first is a 383 cu. in. V-8 with a 10:1 compression ratio and a 4-barrel carburetor. The second has the same displacement and compression ratio but has two 4-barrel carburetors. Both of these engines use premium gasoline. The 383 cu. in. V-8 is an extra cost option. The dual, 4-barrel unit is a refinement of the well-known ram-induction power plant. This unit has dual exhaust and a special camshaft.

The Polara 361 cu. in. and the 383 cu. in. engine with 1 barrel carburetor have the same engineering refinements characteristic of all 1961 Chrysler Corp. cars and previously mentioned.

A full line of optional equipment, both dealer installed and factory installed give the prospective owner almost anything he wants in the way of added accessories or systems to suit his needs. One feature which may be commented on in connection with the Dodge stationwagons is the power-operated tailgate window. This is controlled from the driver's seat. Also noteworthy are vacuum door locks, Solexglass and special factory installed undercoating.

## Plymouth

*Three-quarter view of the 1961 Plymouth two-door sedan. The former upswept wings at the rear have been omitted.*

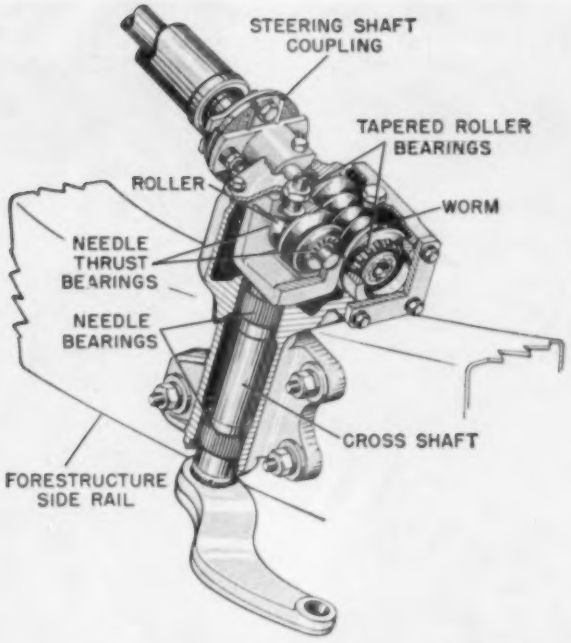
● PROBABLY THE OUTSTANDING feature of the Plymouth line for 1961 is the wide variety of choice of power and transmission units with a range from top economy to high performance. In carrying out this program, Plymouth offers 26 different models, 7 engines and 4 different transmissions.

In the Savoy line are 2 and 4-door sedans with either 6-cylinder or V-8 engines; the Belvedere line has 2 and 4-door sedans and a 2-door hardtop, all available with either a Six or V-8. In the Fury line are a 4-door sedan, a 2-door hardtop, a 4-door hardtop, all available as a Six or V-8. The convertible is offered only as a V-8. There are nine different suburban station wagons in the line, including 2-door, 6-passenger; 4-door, 6-passenger and in the DeLuxe line, a 4-door, 6-passenger. All of these are available with either a Six or V-8 engine. In addition, there is a 4-door, 9 passenger Custom and a 4-door, 9-passenger Sports Suburban, all of which are equipped with the V-8 engine only.

New features in the 1961 Plymouth are largely in the nature of refinements. Improvements in the steering system make the steering easier and more exact. New cushioning is built into the shock absorbers for a quieter ride and the speedometer also has been quieted by use of a magnetic drive which eliminates much of the metal to metal contact. The starting system has also been quieted with the new solenoid shift.

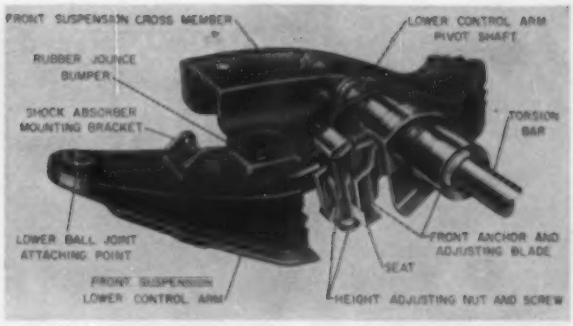
On the 30-D engine, known as the Economy Six, the carburetor has a new anti-perculation feature to insure quicker hot starts and to reduce "hot stall." There is also a new choke and a new heat valve and improved calibration on this new carburetor. On the 361 cu. in. Golden Commando V-8, better performance has been secured by means of a larger diameter intake valve improving volumetric efficiency. The compression ratio on this engine has been reduced to 9:1 for operation on regular fuel.

Along with the engine economy features, Plym-




*Low-friction manual worm and roller type steering gear used on the 1961 Plymouth.*

outh is introducing three different manual transmissions besides the Torque Flite, 3-speed automatic and the Power Flite, 2-speed automatic transmissions. A new, heavy-duty manual transmission is standard equipment on all 361 and 383 cu. in. V-8's and all 318 cu. in. V-8's with the power pack as well as all heavy-duty taxis. This transmission is designed




***Front suspension height adjustment is a service feature found on the new 1961 Plymouth.***

for heavy torque capacity and uses ratios of 2.55:1 and 1.49:1 with a reverse ratio of 3.34:1. Helical gears are employed and the second and high gears are synchronized for smooth shifting.

#### NEW LIGHTWEIGHT TRANSMISSION

For the 318 cu. in. Fury V-800 engine, there is a new light weight manual transmission which employs shot-peened gears in a ratio selection of 2.12, 1.3, and 2.73 (reverse) to 1. There is also an improvement in the manual transmission for 30-D Economy Six engine in that the low gear ratio has been changed from 2.50 to 2.71:1. It provides easier starting on steep grades and more lively breakaway performance. It also delivers more torque to the wheels at low speeds.

A number of other features on Plymouth are products of Chrysler Corp. engineering found throughout the entire line.

## *Valiant*

● VALIANT, LAST OF the three compact cars new in 1960, has no radical engineering changes for 1961, although there are a number of refinements both as regards body and chassis. The 1961 Valiant is offered both in the V-100 and the V-200 series with a total of six models. The 4-door sedan and 4-door 2-seat Suburban are available in both series. The 2-door sedan is confined to the V-100 and the 2-door hardtop is available only as a V-200. The 4-door, 3-seat Suburban which was available last year as the V-200 has been dropped from the line. Instead, as a dealer installed option, a third seat package is available for buyers who require more seating space. For greater passenger comfort, the seat back of Suburban rear seats has been widened by 4¼".

Refinements in the Valiant have had as their objective a smoother, quieter operating car. All models are powered by a 6-cylinder overhead valve engine with a displacement of 170 cu. in. This year the compression ratio has been reduced from 8.5 to 8.2 to enable the engine to handle non-premium fuel more efficiently. The engine is quieter and smoother as a result and less sensitive to carbon deposits.

***Valiant for 1961 has no radical engineering change although there are a number of chassis and body refinements.***

LOOK WHO DEALERS FROM COAST TO COAST
Miss AUTOLITE
AUTOLITE

## *Here's your winner!* MISS AUTOLITE FOR 1960

The votes are in, over 100,000 of them! Dealers from coast to coast have elected Miss Suzy Smith from 12 beauty finalists to reign as *Miss Autolite for 1960.* (*Vital Statistics:* born in Knoxville, Tenn. Blue eyes. Blonde hair. A curvy 35-23-34.) Above, Dave Garroway crowns her *queen* to climax another big spark plug promotion from Autolite. For Suzy this means a guest appearance on the Garroway NBC-TV "TODAY" Show as well as appearances in Autolite sales regions across the country. We're pleased to pass on a "thank you" from this year's Miss Autolite to all the dealers who voted for her and to remind you: Keep your eye on Autolite. Another big spark plug promotion will be coming your way . . . soon!

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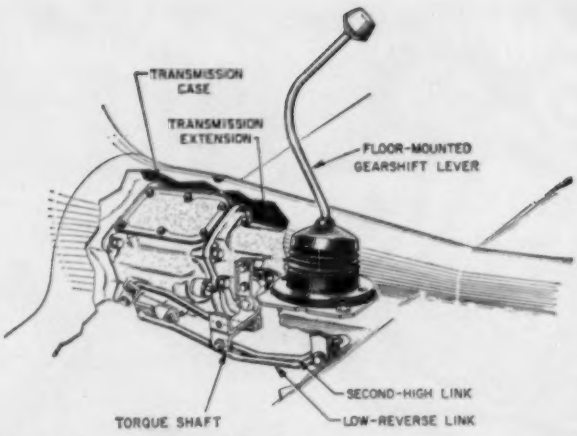
Speed, performance and economy are improved by revised calibration of the choke and carburetor and the carburetor has improvements which virtually eliminate flooding caused by dirt.

**MANUAL SHIFTING IMPROVED**

The manual transmission shift linkage has been improved to provide a more positive feel in the shift pattern and the gear shift lever has been re-located. Design of the parking brake has been simplified with the result that pedal effort has been reduced to little more than half of last year's figure. The Oriflow shock absorbers have also been re-designed for quieter operation because of smoother and quieter valve opening.

The 1961 heating and ventilating system has been refined for better control of air distribution. A special engine cooling fan is provided as part of the air distribution. It pulls more air through the radiator than the regular engine fan. Air conditioning is handled by re-circulating type unit offered as a dealer installed option. Two centrifugal blowers force air through the evaporator coils, where it is cooled and de-humified. The air then passes through

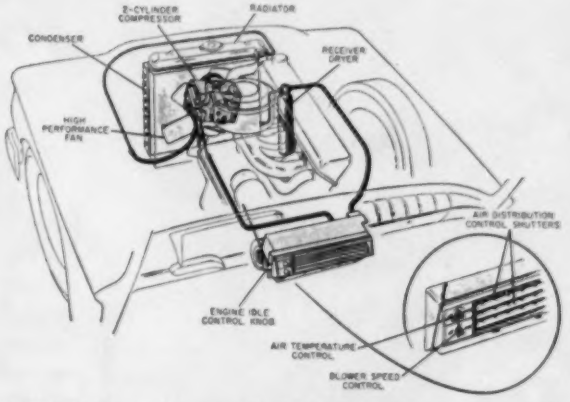



*Valiant manual transmission shift linkage has been improved to provide a more positive "feel" in the shift pattern.*

distribution grilles into the passenger compartment.

The electrical generating system is again designed around an alternator which has the advantage of generating current while the engine is idling, providing quicker starts in extremely cold weather.

The V-200 Series is the top of the line and is distinguished from the V-100 Series by its deluxe trim. The V-200 Series has moldings which distinguish its models from those in the V-100 Series. A stainless steel drip rail molding is standard on the V-200 Series, while the door upper molding and rear quarter window molding are optional. Most noticeable change from the front in all models is the new grille, which is bolder and has a more open appearance, due to a chrome-over-black background treatment.




*The 1961 Valiant air conditioning is handled by a recirculating type unit, offered as a dealer-installed option.*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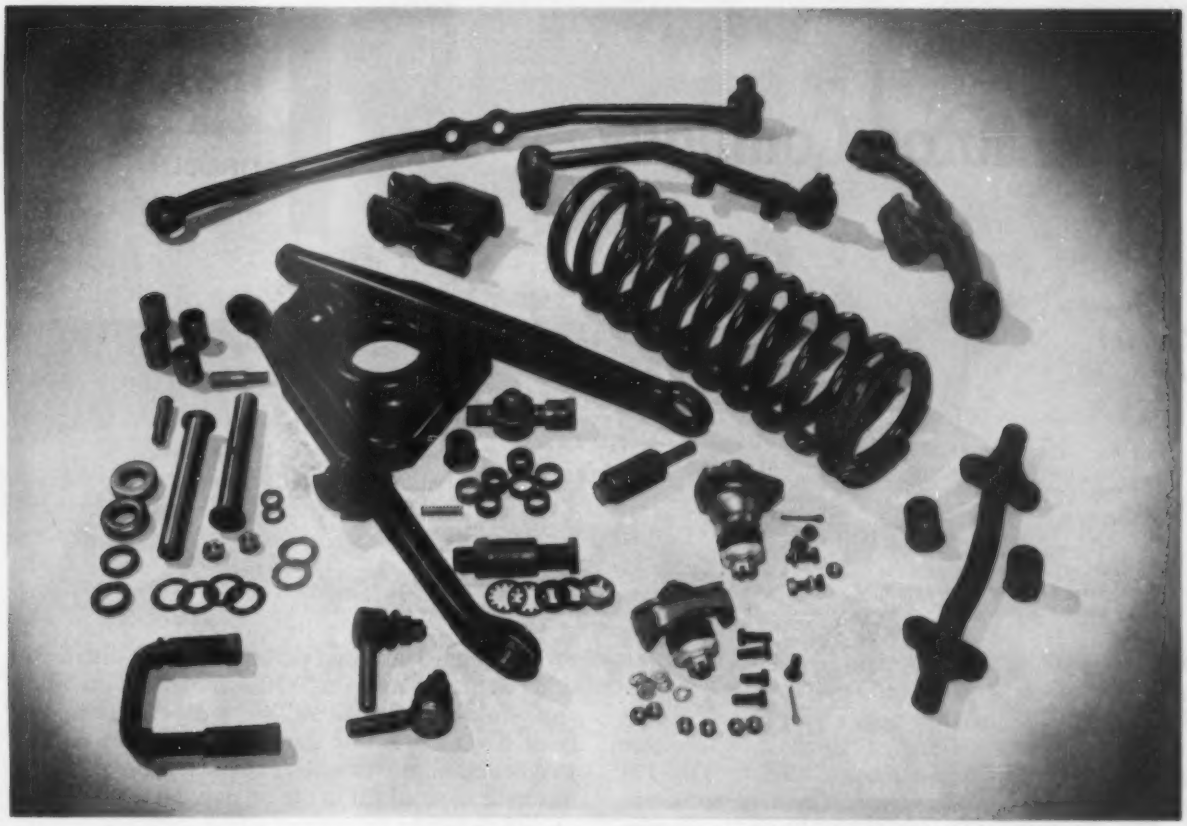

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# Ford Motor Company

COMET
FALCON
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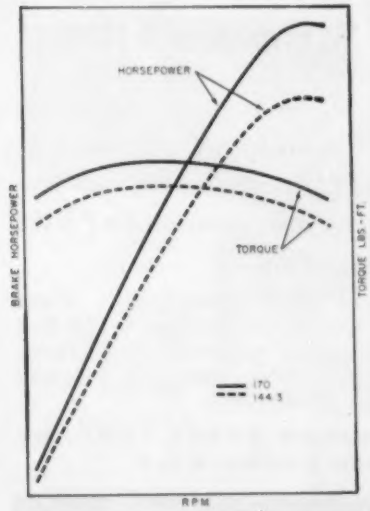
## Comet

*Comet for 1961 features its original styling plus a new grill and modest ornamental changes.*

● COMET FOR 1961—which for 1960 was only offered with one engine, the standard 144.3 cu. in. Six—now carries the same engine and also an option of a 170 cu. in. Six designed for those who desire greater performance and passing ability. The 170 gains its additional displacement and performance by lengthening the stroke. The 170 cu. in. engine has the same bore as the 144.3 engine, namely, 3.50″; but while the stroke on the standard engine is 2.5″, it is 2.94″ on the optional 170.




*Horsepower and torque curves of the Comet's 144.3 and 170 cu.in. piston displacement engines.*

On both engines the compression ratio is 8.7:1. Both have single venturi downdraft carburetors and operate on regular grade fuel. Engine detail changes include a new shape cylinder head, with larger intake valves, and larger capacity carburetor with revised venturi bore and calibration. The distributor calibration also is revised. Other modifications which apply to both engines include a die-cast aluminum front cover instead of stamped steel. This reduces weight and improves sealing characteristics. Vertical ribs have been added to the oil pan, increasing rigidity and reducing drumming effect.

The drive shaft is now 2.75″ in diameter and some drive components are changed to accommodate the higher torque in the 170 cu. in. engine. The automatic transmission is water-cooled and the muffler capacity has been increased on sedans. On Comets equipped with the 170 cu. in. engine, and automatic transmission, the radiator lower tank has a heat exchange for transmission oil cooling.

## Falcon

● FORD CONTINUES TO OFFER the Falcon in one series consisting of two sedans (2-door and 4-door) and two station wagons (2-door and 4-door). An optional interior, exterior trim package is also available.

Mechanically speaking, and to meet the desires of those who want a compact car without sacrificing performance, a new optional engine of 170 cu. in. displacement is available for 1961. The standard unit for the Falcon is the cast iron in-line water-cooled six-cylinder 144 cu. in. engine.

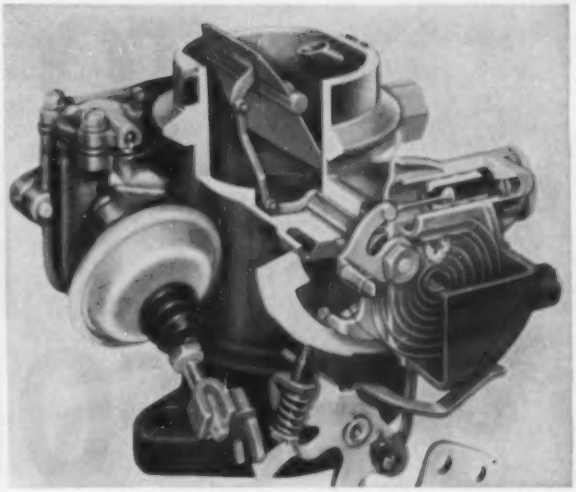
There are no major changes in the Falcon; only a number of detailed improvements, both mechanically and in styling are apparent. Both the 144 cu. in. standard and 170 cu. in. optional engines have a new "snorkel" type air cleaner that results in quieter operation and more uniform air flow for smoother engine operation at higher speeds. The engine front cover, formerly of stamped steel, is

*Falcon is continued for 1961 without major changes. A number of detailed improvements, mechanically and in styling are apparent.*

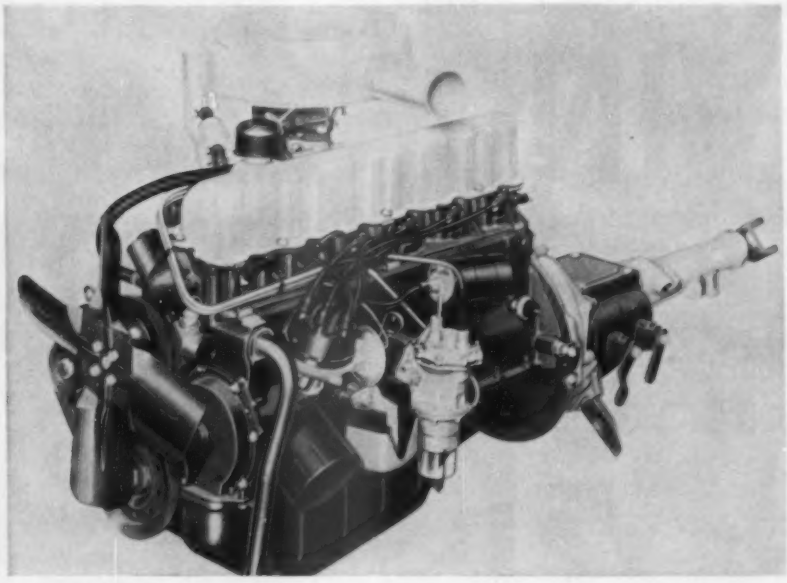
now die-cast aluminum, lighter in weight and provides better sealing characteristics. The oil pans of both engines have vertical ribs in the pan sides.

The carburetor spacer has been revised to accommodate the wiper vacuum tube take-off, formerly located in the intake manifold. When wipers are in operation this arrangement maintains more uniform fuel mixture distribution for improved engine idling. Smoother accelerator linkage operation results from a re-mounting of the bell crank on the carburetor spacer instead of being bolted to a stamped flange. An automatic choke is available for both the 144 and 170 cu. in. Falcon as a dealer special order item only.

The 170 cu. in. Falcon 6 is available with either the manual or automatic transmission. It uses regular grade fuel, has a single venturi carburetor, single exhaust and a compression ratio of 8.7:1. The bore is 3.50" and stroke is 2.94". This engine differs from the 144 cu. in. Six as follows: A different crankshaft to accommodate the stroke increase; different con-

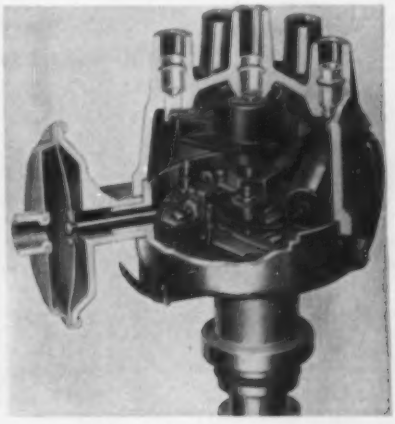


*Falcon's carburetor for the 170 cu.in. engine is larger in capacity and has an improved choke plate design.*



*Left: Both the 144 cu.in. standard Falcon engine and the 170 cu.in. engine (shown) have a new "anorkel" type air cleaner.*

*Below: Cut-away-view of the Falcon ignition distributor.*



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*MOTOR—June, 1959

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necting rods, due to the stroke increase; new slipper pistons; new cylinder heads for the higher compression ratio with larger intake ports and valve heads for proper distribution; larger intake valves; new distributor with revised calibration; new main bearings, water pump pulley, water pump, water pump impeller and 15" fan.

The carburetor for the 170 cu. in. engine is new, larger in capacity and has an improved choke plate design. Although the 170 cu. in. engine provides about 18 percent more displacement than the standard Falcon engine, it weighs only about 7 lbs. more.

Falcon chassis refinements include better riding characteristics due to a 10-percent reduction in the rear spring rate in both sedans and stationwagons. A smaller diameter stabilizer bar is used. This is between each lower arm of the front suspension. Threaded pre-lubricated metal bushings are used in the front suspension upper arms, which reduce the harshness experienced with former rubber bushings.

The manual 3-speed transmission is basically the same as that used in the 144 cu. in. engine but has coarse pitched gears. The automatic transmission with the 170 engine is air and water cooled. The converter has been modified to accommodate the additional torque. There is also a heavier rear axle and larger ring gear for the increased torque output. Other modifications include: Additional fins in the radiator and use of an oil cooler in the bottom of the radiator for automatic transmission oil cooling.

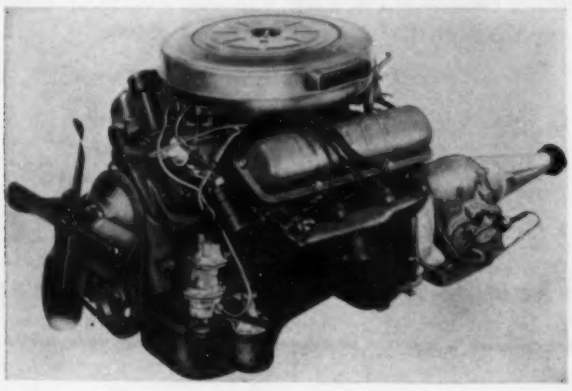
## Ford

*Ford Starliner for 1961. The '61 models have pre-lubricated chassis lubrication points for extended lubrication intervals.*

● THE 1961 FORD is 3.7" shorter than the 1960 model and 1.6" narrower, with no sacrifice in passenger seating space. The "greenhouse" in some models has been shortened, and the overall result has been a new look for the coming year.

Two significant engineering announcements by Ford which will excite attention throughout the industry are the extended chassis lubrication interval of 30,000 miles and a recommended 6,000-mile oil change interval. The extended chassis lubrication interval is a result of new tough plastic seals and liners, plus a special grease having a molybdenum-disulfide base. Further engineering advances in oil filtration, combined with Ford's full-flow oil filter, are back of the Ford recommendation for a 6,000-mile oil change interval.

*Four engines are available in the 1961 Ford line. Shown here is the 390 cu.in. V-8, which has a four-barrel carburetor.*



Among other new Ford features are: Self-adjusting brakes as standard equipment; mechanically activated valve adjusters on the Mileage Maker 6-cylinder engine; a new power option engine of 390 cu. in. displacement, and roll-down window in the station wagons. In addition, more galvanized material is used in the underbody structure for more complete rust proofing of the body.

The 1961 Ford offers a choice of four engines; (1) The 233 cu. in. 6-cylinder; (2) 292 cu. in. V-8 with two-barrel carburetors; (3) 352 cu. in. V-8 with two-barrel carburetors and (4) 390 cu. in. V-8 with four-barrel carburetors. In addition, a high-performance version of the 390, four-barrel unit will be available as a regular production item. These are identical in displacement, horsepower and torque as in the 1961 Mercury.

A basic improvement, regarded in the engineering department as one of the best Ford developments, is a no-lash rocker arm which forms a valve train lash compensating device claimed to be capable of producing performance on economy levels equal or superior to engines equipped with hydraulic valve lifters. This is used in the 6-cylinder engines and is entirely mechanical, but eliminates tapping. It is comprised of a rocker arm, eccentric, eccentric spring and plunger and the adjusting screw. The eccentric, in effect, is a cam which is wedged against the valve stem through the action of the spring and

plunger and thus is capable of compensating for changes in the valve stem length as a result of wear or growth. In conventional mechanical systems clearance is provided for growth and adjustment as required for wear. These often result in excessive valve train noise when the engine is cold or the valve lash increases. The new device automatically compensates in both directions.

The bore and stroke of the 390 four-barrel engine have been increased to 4.05" and 3.75" respectively. This increases the displacement from 352 cu. in. to 390 cu. in.

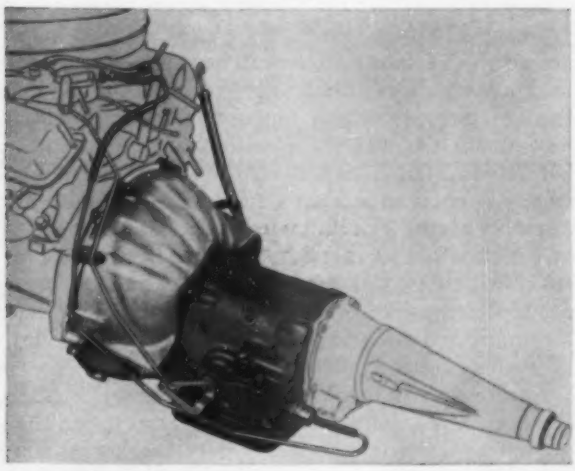
Standard on the 390-4 V-engine, and optional on all other Ford engines, is an anti-air pollution device in the form of an emission reduction system. This is a closed system in which the source of flow energy is manifold vacuum. Blow-by gases are drawn into the intake manifold and are combined with the fuel mixture and emitted through the exhaust system as combustion products.

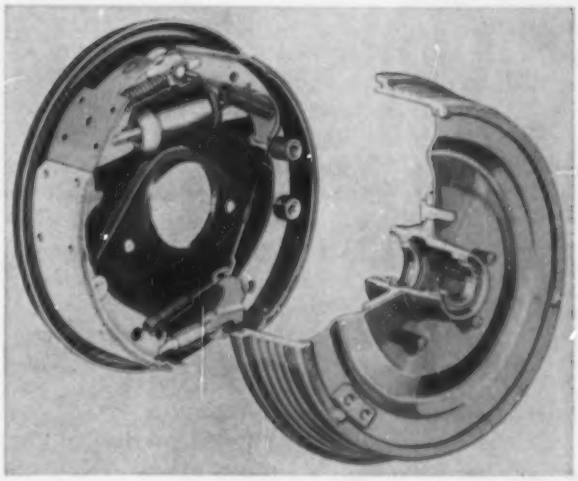
The crankcase ventilation system directs the blow-by gases (which otherwise would be discharged into the air as hydrocarbons) from the crankcase back into the combustion chambers where they are burned and discharged from the exhaust as complete combustion products.

Other engine improvements are the new cast aluminum front cover on the 390-4 V-engine, which minimizes oil leaks and provides a more rigid support for the new high-capacity vacuum pump, as well as reducing weight. The new vacuum pump has an increased capacity of 25 percent more air flow for improved windshield wiper action under all conditions.

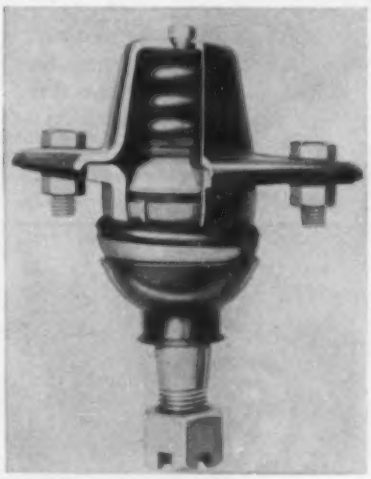
Most of the previous chassis features are incorporated in the 1961 Ford models, with refinements as follows: (1) A more balanced body-frame strength relationship, gained by some increase in flexibility by reducing the thickness of the inner channel used in the side rails. (2) Softer air springs on all models, except 2-door sedans and 2-door hardtops. (3) Prelubricated chassis lubrication points by means of a special grease having a molybdenum-disulfide base. All grease fittings have been removed and in their place are small threaded plugs which may be replaced by grease fittings after an extended interval estimated at 15,000 miles or better. (4) Re-calibrated shock absorbers. (5) A new flexible coupling in the steering shaft to reduce transmission vibration. (6) More effective insulation of the body from the chassis by use of a new butyl biscuit. (7) Quieter tire tread.

*The 1961 Ford Cruise-O-Matic is equipped with vacuum throttle valve controls, thereby eliminating mechanical linkage.*





*Brake linings are thicker and the Ford method of self-adjusting brake shoe clearance is standard for 1961.*



*More effective body insulation from the chassis is obtained in the '61 Ford by a new butyl "biscuit."*

Refinements in the braking system include less pedal effort through greater conformity of mating between the drum and shoe. Pedal geometry has been revised to increase the mechanical advantage for reduced pedal effort. Brake linings are thicker and the Ford method of self-adjusting brake shoe clearance is standard.

The manual steering system is designed to reduce

steering effort up to 25 percent. The higher steering gear ratio, increased to 22:1 from 20:1 results in an overall steering ratio of 30:1, up from 27:1. New needle bearings are used and all 1961 Fords have the new flexible coupling in the steering shaft which reduces transmission vibration and eliminates binding in the column or gear box.

For cars with power steering, there is an all-new power unit known as the "reaction-limiting type." The unit is claimed to reduce parking effort as much as 50 percent over previous models. Power steering ratio remains at 20:1, with an overall steering ratio of 25:1.

#### DRIVE LINE COMPLETELY OVERHAULED

For 1961, Ford has completely overhauled the drive line. This includes the 3-speed manual, overdrive, dual range Cruise-O-Matic, and 2-speed Ford-O-Matic. There have also been a number of refinements in the rear axle and drive shaft areas.

The Cruise-O-Matic transmission is lighter by 25 lbs. and has smoother, more precise shifting than previous models. It is equipped with vacuum throttle valve controls which improve the method of relaying the driver's accelerator pedal setting and the throttle positions to the transmission. This system eliminates mechanical linkage and allows the transmission to respond more accurately to the driver's throttle control.

The rear axle incorporates a pinion pilot bearing of smaller diameter than previously. This smaller diameter has permitted increased differential carrier strength and improved bearing load distribution. With the 390-4-V engine, equipped with standard or overdrive transmission, the differential has four pinions in order to withstand the higher torque.

In the driveshaft line the universal joints have been improved with end-relieved needle rollers, improved surface finishes, and more rigid bearing cups at the companion flanges. High capacity universal joints are used with the 390-4-V engine, together with a driveshaft of larger diameter for standard and overdrive transmission cars only. The rear axle carrier casting is re-designed to provide equal strength, but is several pounds lighter.

A full line of options is available throughout the Ford line, including air conditioning systems. Among the new features are an electric windshield wiper and new front and rear bumper guards with conical rubber impact points. The power window master control switch provides a lock-out, which in the "off" position makes the operation of any or all of the windows possible only through the master control at the driver's seat.

## *Lincoln Continental*

*The completely new engineered Lincoln-Continental for 1961 has a wheelbase of 123" as compared with 131" for the 1960 models.*

● THE COMPLETELY NEW engineered Lincoln Continental for 1961 has a wheelbase of 123" as compared with 131" for the 1960 model. The car carries its characteristic identification resulting from its long hood, short "greenhouse," and low overall height. The new overall length is 212".

In spite of this difference of approximately 8" in length, the 1961 car offers the same leg room of 44" as in the 1960 Lincoln Continental, and a rear leg room reduction of only 1.4", with other important dimensions being comparable with the much larger 1960 car. Overall height in 1961 is 53.5", compared with 56.7" in 1960. Rear entrance room between the rear seat and door is actually greater than with the larger 1960 car. This is made possible by rear doors, hinged at the rear.

The 430 cu. in. engine incorporates for 1961 many design and production features in the interest of long life, quietness and trouble-free operation. The engine after-assembly is run in for 3 hrs. and then torn down for visual inspection and re-assembly before installation in the vehicle. In addition, the engine is checked during a 12-mile road test at the assembly plant. The initial break-in eliminates much of the need for further adjustments. Improved premium oil is used at assembly and eliminates need for replacement of break-in oil at 1,000 miles. The recommended interval for oil changes is 6,000 miles, as in some other Ford products.

Improvements made for quiet operation include single-coil, constant-pitch valve springs; an improved distributor with heavy-duty breaker points;

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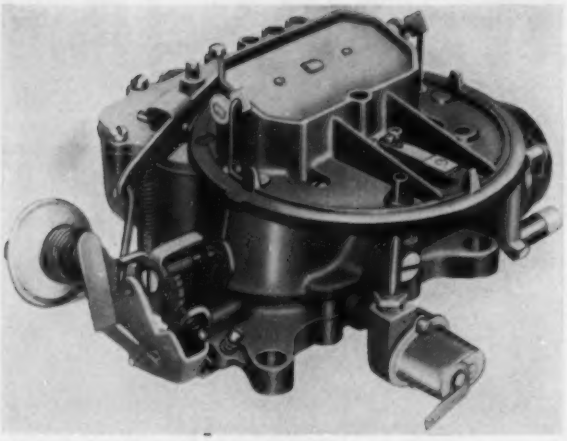


*Lincoln-Continental carburetor. All linkage is dichromate plated and an iradite coating is applied on the die-cast aluminum body.*

a by-pass system on the carburetor for smoother idle, stepped diameter camshaft journals and bearings to reduce noise level (by reducing the possibility of damage during assembly) and a nylon rim added to the camshaft drive sprocket for quieter operation.

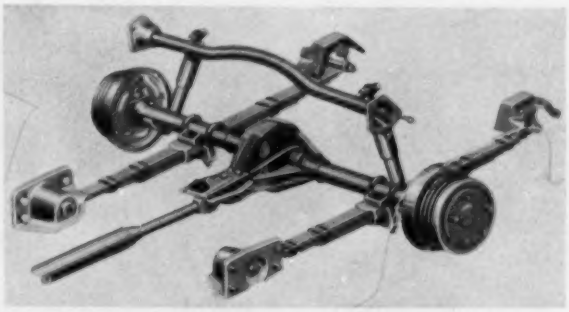
To ward off oil or water leaks, improved gaskets are provided in such areas as the engine oil pan, surge tank, rocker arms, valley cover, water pump, rear cover, power steering reservoir, and between power steering pump and engine front cover.

Pistons described as the "conformatic" are new for 1961. A full circle steel ring completely surrounds the piston. The new design is claimed to allow better oil control ring operation. Previously, two separated steel inserts at the piston bosses were used.

Improvements have been made on the carburetor. All linkage is dichromate plated and an iradite coating is applied on the die-cast aluminum carburetor body. Nylon seals are used around the choke plate rod where it passes through the air cleaner mounting flange. Internal improvements include the use of a new by-pass idle system, the provision of filtered air for the choke and design of a new air-conditioning idle compensator. The new carburetor by-pass idle system represents an improvement in the control of idling speed. The system no longer depends upon the critical throttle plate opening for speed control. Throttle plates are now completely closed at idle and a by-pass system meters air through a valve in the rear of the carburetor body. The new carburetor air-conditioning compensating arrangement consists of an electric solenoid activated by the air-conditioning compressor. When the compressor is in operation, the solenoid opens a small passage which bleeds additional air into the carburetor to increase engine idle rpm for ample generator charging with the additional load.

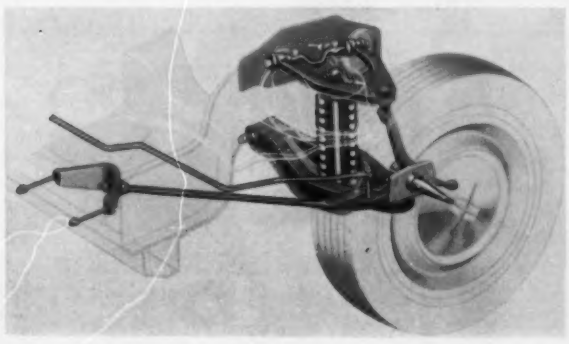
The new Ford emission control system for unburned fuel is standard equipment. New exhaust valve rotors are included and as in previous models, the intake valves are equipped with "free-turn" rotators. To reduce the possibility of corrosion and consequent tappet wear, the hydraulic tappets incorporate chrome-plated plungers and a stainless steel outer body.

A fully aluminized exhaust system is used. Coating is applied to mufflers, resinators and, for the first time, to the laminated exhaust pipes. At each exhaust pipe juncture, heavy duty flanges are bolted together, replacing the slip joint used previously. Another change is the movement of the cross-over pipe into the kick-up area.



*Lincoln-Continental rear suspension showing the new springs, new shocks, flared drums and large spring bushing.*

*Details of Lincoln-Continental's new front suspension, showing the new isolated strut.*



A much smaller front tunnel size for the 1961 car has been provided by a smaller transmission mounted to the 7° engine angle using a 14.1" diameter ring gear with a shallower oil pump. A constant velocity front universal joint allows further lowering of the transmission for the lowest possible tunnel silhouette. Light weight aluminum is used in the converter bell housing and transmission extension. An improved dacron filter eliminates dirt in the transmission fluid and improved seals help eliminate leaks. A needle-bearing slip yoke design is employed at the coupling of the transmission output shaft of the driveshaft. The needle bearing provision allows smooth drive-line operation since the

fore-and-aft slippage and friction at the splines, used in the conventional arrangement, is eliminated.

Front suspension has been improved by a device called by Lincoln "silent-strut." The term applies to the new method of attaching the front suspension lower arm to the body cross-member by use of an insulated strut. A thick rubber bayonet-type of bushing is used. This new construction permits damping out road noises that could penetrate into the passenger compartment. The basic design of the ball joints is somewhat similar to the 1960 units but the lubricant and seals are revised. Rubber and polyurethane seals are used to retain a special lubricant, thereby eliminating the need for frequent servicing.

The rebound cut-off control consists of a special provision to gently slow the front wheel to a stop in a down direction without the impact or feed back of an ordinary rebound bumper. The shock absorber characteristics are tailored exactly to the car weight. Rear shock absorbers are spaced farther apart.

The method of attaching the new rear spring at the front eye has been improved by the addition of a 2" diameter rubber bushing. This is ½" larger than previously. The increased diameter allows a slight degree of rearward wheel movement on severe bumps, helping to absorb shock and noise. Another new feature is the spring-to-axle attachment. A sheetmetal box structure lined with ½" thick butyl rubber completely insulates the spring, giving a smoother, more shock-free ride. In effect, the car is riding on a layer of butyl rubber.

A 100 percent increase is claimed for potential brake lining life over 1960. Flared cast iron drums on sedan models aid in the heat dissipation and flared aluminum drums with cast iron liners are also used on the heavier convertible models.

Typical of the changes made to give the increased rigidity and strength to the unitized body is in the center pillar, which is welded directly to the underbody side sill and rocker panel. With this construction the rear hinged rear door is used. This permits use of a pillar with a stronger, more rigid bulkhead base.

A new rust-proofing material has been provided in that the main structural members throughout the underbody, including the rocker panels, are galvanized steel.

The electrical system has been improved in many details. The life of the 40-ampere generator is extended by the use of improved brushes, brush holders and bearings. The generator provides a lower cut-in point to provide current output at lower engine speed.

A feature which will be appreciated, and which could be more widely used, is a vapor separator in the fuel line between the fuel pump and carburetor on the air conditioned cars, preventing vapor lock by automatically routing excess vapors back to the fuel tank.

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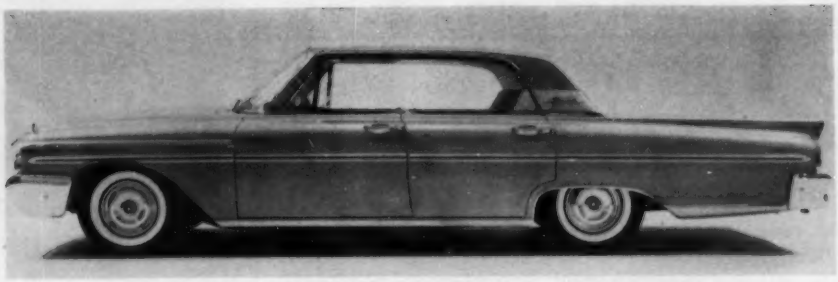
## Mercury



*Mercury bodies are completely new. Roof design incorporates a moderate wrap-around windshield.*

● MERCURY CARS FOR 1961 will be new in appearance, size and equipped with power plants of less piston displacement and weight compatible with the lighter weight vehicles. Bodies are completely new and while basic Mercury engineering is continued, modifications prevail throughout body, chassis and power line. The roof designs now incorporate a moderate wrap-around windshield eliminating the prominent dog-leg protrusion into the front door opening area.

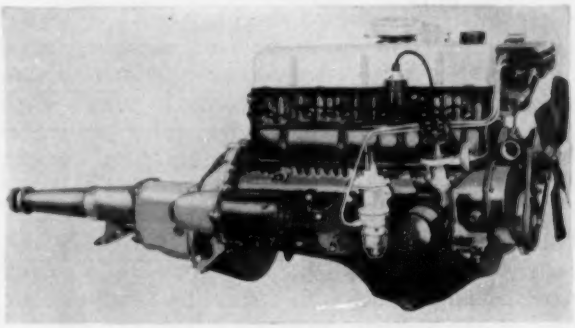
All engines are completely new for 1961, with less displacement and weight. There are four different displacement engines in the line, including a new 6-cylinder entry for Mercury. The new engine is a 223 cu. in. unit which Mercury calls its "Economy Six". Horsepower is 135 at 4,000 rpm, torque 200 ft. lbs. at 2000 rpm.

The 292 cu. in. Mercury Economy V-8 engine is a slightly smaller version of the 312 cu. in. economy V-8 used in 1960. An over-square design with 3.75" bore and 3.3" stroke, the power plant has a compression ratio of 8.8:1, allowing satisfactory operation on regular fuel. A 2-barrel carburetor with automatic choke is used. Mechanical valve lifters are used on this engine. Horsepower is 175 at 4200 and torque 270 ft. lbs. at 2200 rpm.

The 352 cu. in. engine will be a power option for all 1961 series. This engine has a 2-barrel carburetor with automatic choke. Bore is 4" and stroke is 3.5", and with this power plant, regular fuel is recommended. Hydraulic valve lifters are used on this engine. Horsepower is 220 at 4400 rpm and torque 336 ft. lbs. at 2400 rpm.

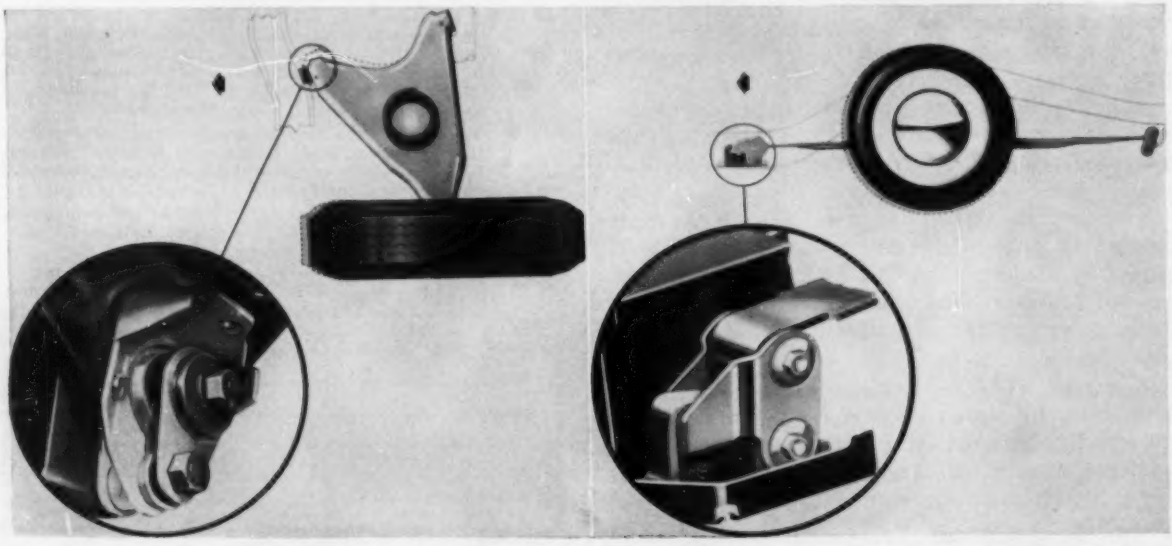
The 390 cu. in. engine has a 4-barrel carburetor with higher compression and is available as a pow-

*(Continued on page 78)*



*Mercury's new 6-cylinder 223 cu.in. engine is known as the "Economy Six". Horsepower is 135 at 4000 rpm.*

*'61 Mercurys use a "cushion-link suspension" to absorb initial shock of road irregularities.*



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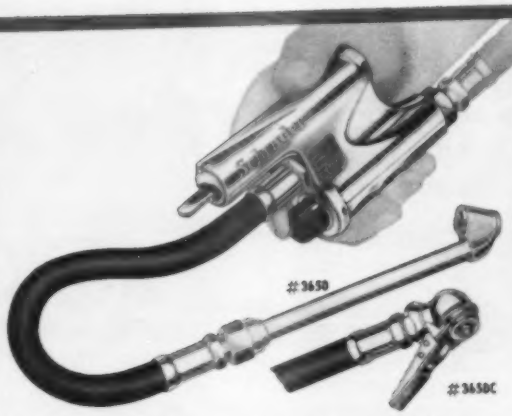


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## Buick Special

*Buick 1961 Special (4000) which has a 112" wheelbase and is powered with an aluminum alloy engine of the dry sleeve type.*

● THE BUICK LINE for 1961 comprises revised editions of the LaSabre (4400), Invicta (4600) and the Electra (4700), and an entirely new smaller car, the Special (4000).

The new Special (4000) has a 112" wheelbase with 56" tread and a total overall length of 188.4". Body width is 71.3" and height is 52.5". Like other Buicks, the new Special is a 90° V-8 valve-in-head engine. Although it is completely new. Bore and stroke are 3.50" x 2.80", providing a displacement of 215 cu. in. with a standard compression ratio of 8.8. Horsepower is rated at 155 at 4400 rpm. and maximum torque 220 lb. ft. at 2400 rpm.

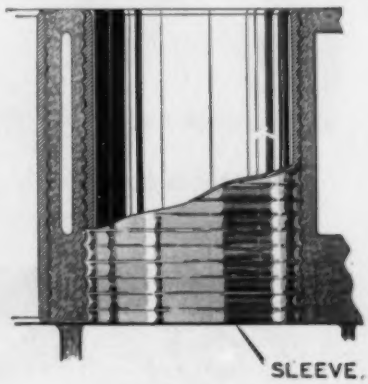
The engine is an aluminum alloy unit of dry sleeve type. It is designed to operate on regular grade fuel with either synchromesh or automatic transmission. This new engine is easily recognized by its profuse use of aluminum. Made of aluminum are the cylinder block, cylinder heads, intake manifolds, timing chain cover and water pump cover, as well as many smaller parts. The engine weighs 318 lbs. Based on the lower cubic inch displacement and reduced car weight, this engine provides maximum fuel economy in the Buick for 1961.

Alloy-iron sleeves are centrifugally cast in the aluminum cylinder block. This method has been chosen to give the intimate thermal contact between the sleeve and the surrounding aluminum for highly efficient heat transfer characteristics. The sleeves are mechanically locked in place by circumferential grooves turned in their outside diameter.

The crankshaft is cast Armasteel with counterweights molded to size and shape, eliminating the conventional machining of cheeks and outside diameters. The pistons are permanent mold anodized castings with concave piston domes forming part of the combustion chamber.

The oil pump is an integral part of the timing chain cover, with the pump gears housed in a cavity in the cover. The oil pump cover serves as the base for the oil filter, making the filter unit accessible for servicing or replacement. The intake manifold has a water jacket which heats the incoming fuel-air mixture. This jacket directs cooling water under the manifold, up over the top at the rear end, across the top of the manifold and on the water outlet at the radiator. The need for a separate water manifold is eliminated.

The spark plugs are centrally located over the combustion chamber and are surrounded by water. The skirt is designed to provide more turbulence at




*Buick's alloy-iron sleeves are centrifugally cast in the aluminum block. Sleeves are mechanically locked by grooves which also give intimate thermal contact.*

the firing end of the plug. This design is similar to other Buick engines, with the exception that the threaded portion is ½" long instead of ⅜", to provide more threads in contact in the aluminum cylinder head.

Following usual Buick practice, the camshaft is of cast alloy iron located above the crankshaft at the center of the V. Valve lifters are hydraulic and the valve system is identical with the other models with the exception that the timing interval is shorter, with a 280° dwell as compared with 288° on the La Sabre and 290° on the Invicta and Electra. Also, the Special has a centered iron valve seat insert in the aluminum block.

Another variation from Buick practice is the external re-circulation of cooling water whereas on other models it is internal. On the 4000 Series Special, using synchromesh transmission, the clutch is an easy-operating, manually controlled unit with conventional pedal arrangement. The clutch pressure plate and the driven plate assembly are designed to afford accurate control of plate loading over disc type springs. The clutch is an all-coil spring design in the clutch pressure plate assembly, the same type of clutch used in medium price range cars.

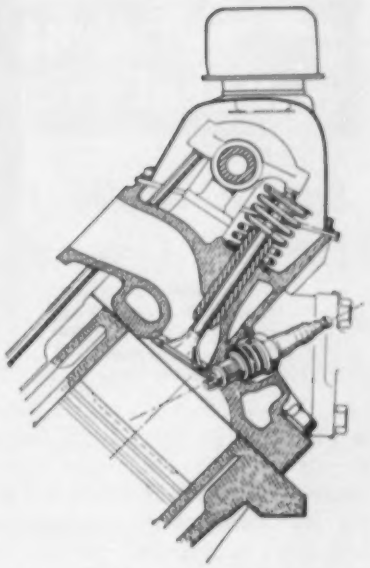
The Buick Special 4000 Series incorporates an automatic transmission with an air-cooled, geared turbine, torque-converter. It is a three-element unit consisting of pump, turbine and stator. The transmission is unique in that it has an automatic clutching device which allows the engine output torque to follow two parallel paths through the converter —one hydraulic and the other mechanical. The hydraulic path is engine converter pump-to-turbine-to-planetary-gear-set-to-output shaft. The mechanical path is engine-to-converter-clutch-to planetary gear-to-output shaft.

The air for cooling enters the transmission at the rear topside of the block, forward of a baffle installed between the rear face of the engine on the front of the transmission case. The air flows down to the center and passes through the baffle, through the flywheel and into the back of the converter pump. This air is then centrifugally forced out across the back face of the pump and is exhausted through the lower flywheel cover, where there are two outlets.

The planetary gearset is located in the converter. This is a unique feature in that one planetary gear takes care of all car manipulations. It provides neutral, all forward speeds and also reverse. There are four friction clutches—namely, the converter, the reverse, the forward and the coast clutches.

The transmission has only one pump which is driven off the engine through the converter housing. This is a dual-purpose pump of rotor type which incorporates the principles of both the vane and piston type in combination. Over-running clutches for both the stator and the turbine sun gear are located

*Spark plug location on Buick Special engine. More threads are in contact with the aluminum cylinder head.*

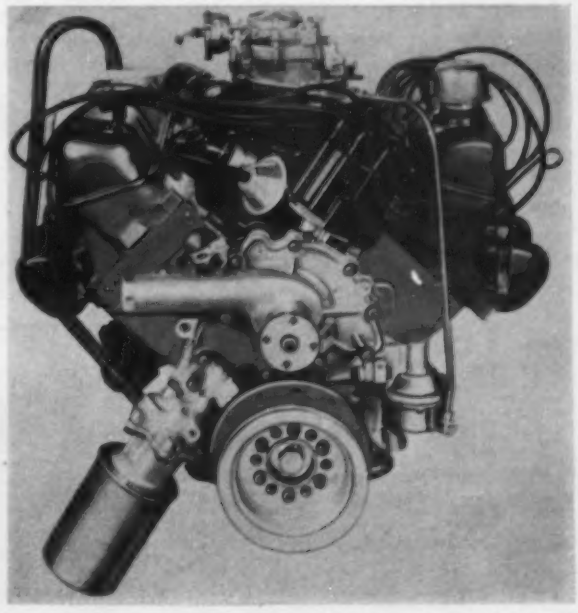


in the transmission proper. In the rear of the transmission is located the parking pawl which is actuated by a spring loaded wedge.

There is a centrifugal-type governor located behind the parking pawl. This governor acts in conjunction with the throttle valve which determines the up and down shifting of the transmission. The coast clutch is engaged in park or neutral to prevent shock loading of the over-running clutch after centrifugal disengagement.

The instrument panel for the Special is entirely different from other Buick models. The speedometer is a pointer type rather than a red liner. Direction signal arrows are on each side of the speedometer.

*The oil pump on the Buick Special is part of the timing chain cover. Pump also serves as base for the oil filter.*



## LeSabre, Invicta, Electra

*Buick LeSabre, four-door hardtop for 1961. The full size Buicks feature a new "cruci-form" frame which eliminates side rails.*

● THE THREE FULL-SIZE Buicks of 1960 are continued for 1961 with many important changes and refinements. Several changes have been made in the frame assembly to reduce weight, concentrate strength where needed, provide increased passenger comfort and to accommodate the new body line.

The new "cruci-form" frame has its side members brought together at the middle to form a central box section. A reduction in the frame weight of 75 lbs. was accomplished by eliminating the side rails and concentrating on a frame uniformly stressed throughout. The absence of the conventional side rails permitted the lowering of sections of the under body and reducing the amount of step-over for easier entrance and exit. A wider, deeper, double channel front end section offers increased resistance to impact while better lateral stiffness with less vibration and shake were made possible by spreading the rails in the rear. This spread rail feature in the rear also provides adequate space for a full, deep trunk. The frame as a whole is practically an all-welded box section type of greater strength and rigidity than provided in last year's model.

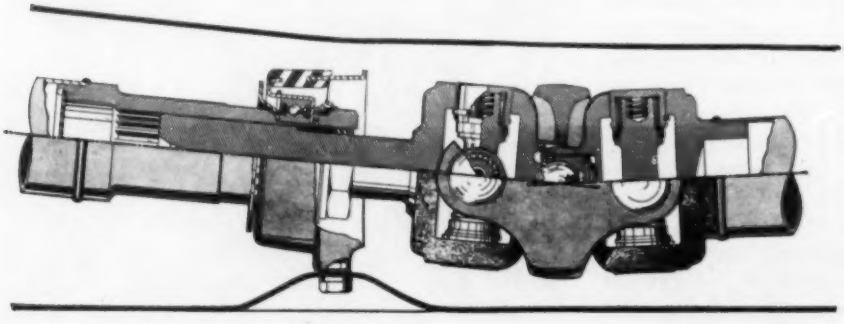
Another major change from previous Buick practice is the adoption of an open-type drive line rather than a torque tube. Driving forces which were previously transferred from the rear wheels to the chassis through the torque tube are now taken by a pair of lower control links. These links are connected to the frame at their front ends and to a bracket attached to the lower axle housing at the opposite ends. An adjustable third link is mounted between the frame side rail and axle housing to prevent the axle housing from rotating about the two lower control links. All mounting points are pivoted through rubber bushings.

The rear axle and drive line have been redesigned to accommodate the new link-type rear suspension. With the elimination of the torque tube, there is no rigid connection between the rear axle and the transmission, permitting individual mounting of these separate assemblies to provide improved damping of vibration and noise.

Internally, the rear axle is similar to that used in 1960, but the drive pinion has been revised to acommodate the attachment of a flange or yoke of the rear universal joint of the new drive line. A reduction of approximately 8 lbs. has been gained in the differential carrier by re-designing it to reduce weight and eliminate the flange previously required for torque tube attachment.

Another effect of the elimination of the torque tube is a completely new design of drive line. The propeller shaft is in two pieces, connected at the front and rear to the transmission and axle respectively by a conventional needle bearing Cardan universal joint of a separable type. A slip-joint is provided near the center where the two shaft connections are connected by means of a double Cardan constant velocity joint.

The center of the propeller shaft assembly is supported from the chassis by means of a low rate rub-



*Slip-joint provided near center of 1961 Buick drive line. The two shaft connections are connected by a double Cardan constant velocity universal joint.*

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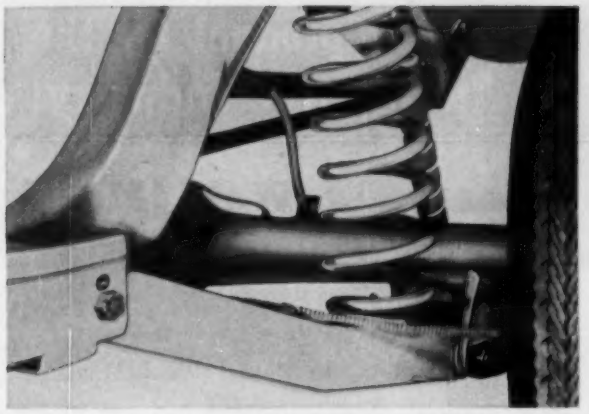

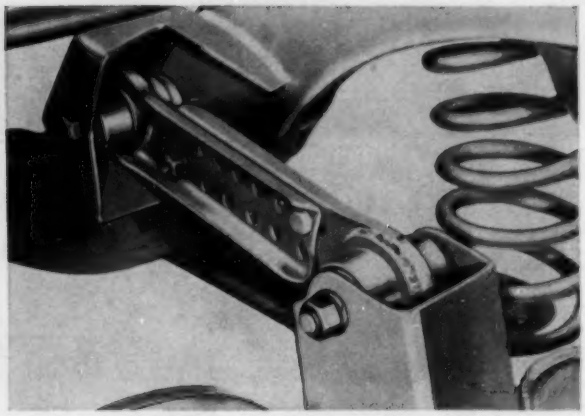

*A major change for Buick is adoption of an open-type drive line rather than a torque tube. Driving forces are now taken by a pair of lower control links (left). On right is upper suspension link.*

ber cuff mounting contained in a sealed-for-life ball centered bearing. The double Cardan universal joint at the center of the propeller shaft consists basically of the two conventional needle-bearing universal joints placed back to back and jointly aligned by means of a support ball socket which guides the two sets of components in proper relationship.

By means of the geometrical arrangement at the center ball the angle formed between the two sections of the propeller shaft is divided evenly between the two sections of the universal joint. This neutralizes forces arising from this combination of joints and produces essentially a constant velocity through this point. The net result is a marked reduction in pulsations of the drive line. The slip spline, lubricated and sealed for protection from road spray, is located just ahead of the constant velocity joint within the center bearing support. This provides for fore and aft lengthening and shortening of the shaft section as required by the suspension movement.

To provide a definite lateral relationship between the rear axle and the frame-body combination, a track bar and cross-member assembly is used. To improve handling, a tie bar between the left and right frame side rails have been added for 1961. This tie bar attaches to the track bar frame bracket on the left and to the frame side rail on the right.

Brake shoes are changed in 1961 to provide a reduction in width and at the same time improve performance. This is accomplished by increasing the drum-swept area to 327 sq. in. instead of 303. The brake shoes for 1961 are 2¼" at the front and 2" at the rear. An interesting change has been made in the power brake cylinder which permits it to draw in air through a filter in the passenger compartment for complete protection against the intake of foreign material in the form of road spray, water or dirt.

#### PRODUCTION CHANGES

A change was made during the 1960 production season incorporating a change from a 2-piece to a 1-piece transmission stator control valve which controls high angle in low and reverse range. The 1-piece valve reduces oil leakage and valve sticking. To improve the feel of the throttle pedal when "switching-the-pitch" the shift point was moved from 7°, 30′ to 14° before wide open throttle. Control rattles have been eliminated by the use of nylon bushings at all connections except at adjustment points. A reduction of 6" in transmission length was made to accommodate the new drive line, frame construction and generally re-designed chassis.

Power-steering continues as standard equipment on Electra and optional on LaSabre and Invicta. The power steering pump, featuring a concentric reservoir has been re-located to give more belt wrap-around which helps to make the steering react more positively. The steering gear is now outside the frame giving longer gear and hose life since these units will run cooler in their new location.

Starting is now accomplished by ignition switch in place of the traditional Buick foot-operated starter. The ignition terminal is now grounded whenever the switch is in the locked position. This eliminates the possibility of starting a 1961 Buick by using a jumper or any other hot wire between the battery and ignition coil.

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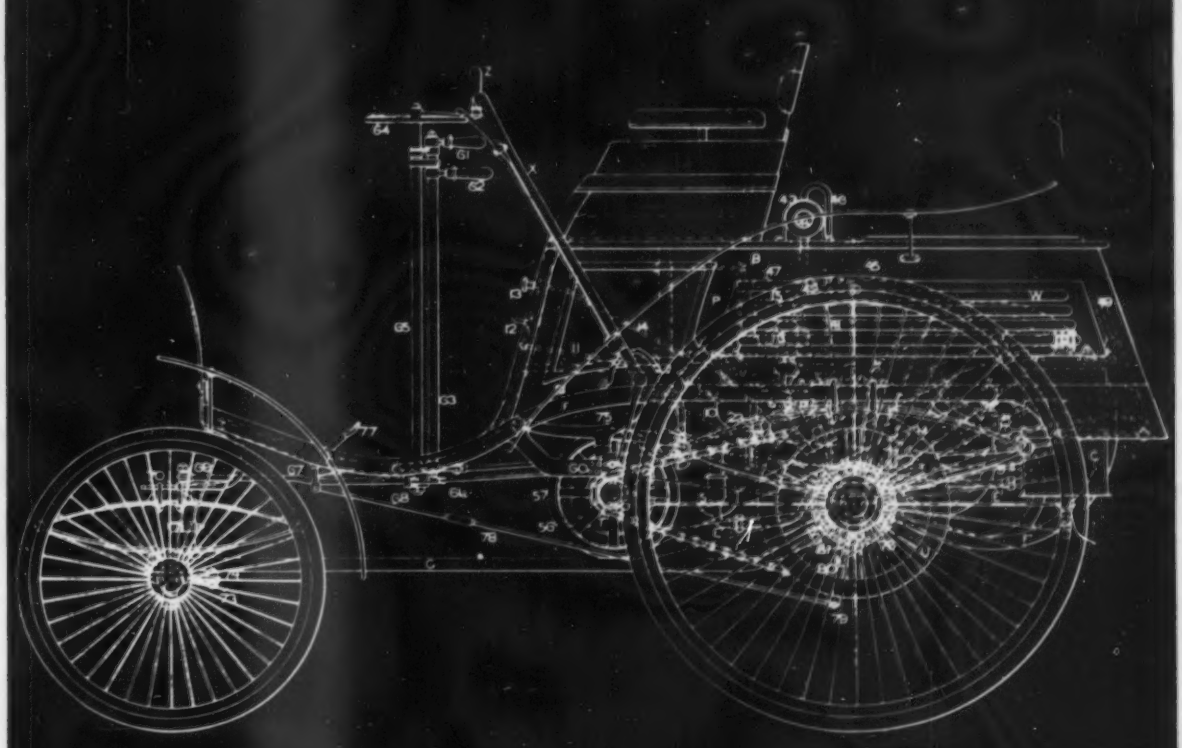

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## Cadillac

*The 1961 Cadillac has a visor-like cap formed by the front fenders and hood.*

*Cadillac's symbolic tail fins are retained, but lowered. Tail lights are integrated into tail fin.*

• BASICALLY, THE CADILLAC Series 62 for 1961 has few fundamental changes from an engineering standpoint, as compared with the 1960 version. Although the car has been reduced ½" in wheelbase, it is 3" shorter in overall length. The wheelbase for 1961 is 129.5" as compared with 130" for 1960 and the overall length of the car is now 222" instead of 225". There has been some increase in roominess in the car, particularly in the headroom as suggested by the fact that the minimum clearance of the 1961 Cadillac is 5.1" whereas it was 5.9" for 1960. Also, the 4-window sedan is now 55.8" high whereas the 1960 is 54.3". This difference in height is approximated in the coupe convertible, and Coupe de Ville.

The power plant has been somewhat refined, although basically it is the same unit, an overhead V-8 engine developing 325 hp. at 4800 rpm. The compression ratio remains at 10.5:1 and the torque output 430 lb. ft. at 3100 rpm. Displacement of this engine is 390 cu. in. with a bore of 4" and a stroke of 3.875".

The more compact dimensions of the car are reflected in its handling. The overall steering gear ratio is now 18.2:1 whereas in the '60 car it was 18.9:1 and the turning circle has been reduced from 47' to 43'. The effective brake lining area has been increased from 210.32 sq. in. to 221.8 sq. in. Axle ratio remains standard at 2.94:1 with an optional ratio of 3.21:1 available.

## Chevrolet

*Chevrolet's 1961 Impalla Sport Sedan. Easier entrance is effected on the various models due to elimination of the "dog leg" which plagued many cars in 1960.*

• THE CHEVROLET BODY model line-up for 1961 differs materially from 1960 with a total of twenty passenger-car models. A two-door sedan has been added to the Impala series, and nine-passenger wagons as well as six-passenger are available in the Nomad, Parkwood and Brookwood categories.

The body and sheet metal are entirely new; roof styles are individual for the regular sedans, sport sedans, sport coupes and station wagons. New windshield wipers are tandem acting, giving a greater wiped area. Vehicle interiors for each series have a new trim and include a new wide-hood instrument panel and new steering wheel.

The 1961 models are slightly shorter, narrower and lower. Although the car is more compact the interior dimensions are maintained generally at the 1960 level. The interior width is reduced about 6" but other variations amount to less than an inch in most cases. Addition of well depressions in the front compartment increase chair height for a more comfortable seating position. Also contributing to passenger comfort, the driveline tunnel in the rear

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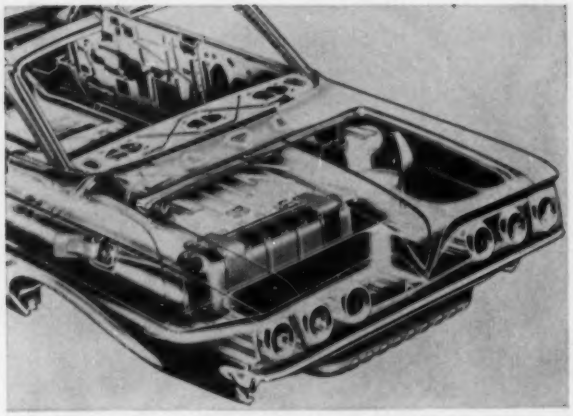


*Phantom view of the 1961 Chevrolet showing the new trunk well and repositioned fuel tank.*

compartment is narrowed.

Easier entrance is effected by the elimination of the "dog leg" at the front entrance and wider doorway dimensions are provided. An advantage is also gained in front and rear over 1960 models in entrance height, door width and step height. Foot clearance in the rear seat area is increased about 2½" with only a slight decrease in front compartment foot room. On the station wagon the tail gate openings are up to 9.5" wider and almost 4" higher for better cargo handling. Load height is also reduced.

## Corvair

• CHEVROLET'S CORVAIR for 1961 comes in three passenger car models and a new station wagon. The model symbols are: 500 (Standard); 700 (De-Luxe); 900 (Monza) and Model 535-737 (station wagon). While the general dimensions are similar to 1960, there have been numerous detail changes. One of the most prominent changes is the abandonment of the auxiliary gasoline heater and the employment of an air flow type heater. In this, the heated air from the air cooling system is used directly for warming the car, providing a more efficient heater while at the same time eliminating the excess gasoline consumption of the previous heater.

Two new models have been added to the 500 and 700 Corvair sedans and coupes and the Monza. These additions are the Lakewood station wagon in both 500 and 700 series, and new 95" wheelbase Greenbrier Sports Wagons, with van-type body, bringing the Corvair model count to nine.

A substantial gain in fuel economy has been made by a number of important changes. Hand-operated chokes are used in place of the single remote automatic choke, providing more positive control for engine cold starts and warm-ups. There is a change in float bowl venting, made possible by the new choke location, reducing carburetor sensitivity to induction system restrictions. The new venting system is arranged so the fuel is more accurately proportioned with respect to air volume, thus preventing the occurrence of over rich mixtures due to improper air cleaner maintenance. To further improve carburetion, and thereby fuel economy, the venturi

*Corvair for 1961 is available in three passenger car models and a new station wagon.*

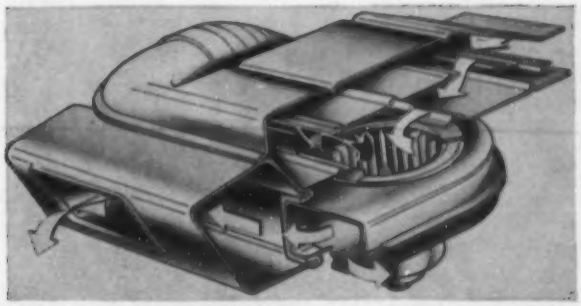
cluster is modified to produce greater fuel atomization, resulting in more even mixture distribution.

Warm-up time has been shortened by re-circulating the engine cooling air through the engine compartment. This also keeps the engine in a warmer environment during the cold season. In addition to more quickly warming the lubricating oil, air taken in for combustion is preheated, reducing the possibility of over rich fuel mixtures due to venturi icing.

A net engine torque increase of 8.2 percent has been implemented to increase overall fuel economy for sedan and coupe models by the use of a lower rear axle ratio. A larger capacity fuel tank of 14 gals. is now standard. Improved economy during cold weather operation also is due to the introduction of the new perimeter heater which utilizes engine heat in place of gasoline.

Increased torque of the optional engine known as the Super Turbo-Air, has been partially due to

*Corvair's underhood luggage space has been increased from 11.3 to 12.6 cu. ft. by relocating the spare to the engine compartment.*



*The new perimeter heater blower and blender arrangement featured in the 1961 Corvair.*

greater displacement. The increase is from 140 to 145 cu. in., and provides the extra torque over the Turbo-Air engine which enables the use of the new economy rear axle, while maintaining desired performance. Comparison of the Super Turbo-Air engine, with the previous Turbo-Air shows the following improvements in performance: Super Turbo-Air is 98 hp. at 4600 rpm as compared with Turbo-Air of 80 hp. at 4400 rpm. Torque of the Super Turbo-Air is 132 lbs. ft. at from 2800-3000 rpm. while on the Turbo-Air it is 128 lb. ft. at 2300 rpm.

A new, fully synchronized 4-speed transmission option is now available on the Corvair. It is available with either the Turbo-Air or the Super Turbo-Air engines. With its compact design, the 4-speed unit is about the same size as the three-speed and less than 6 lbs heavier.

While the outside dimensions generally are the same as for 1960, relocation of the spare tire to the engine compartment increases under-hood luggage space from 11.3 to 12.6 cu. ft. The standard heater on the Corvair for 1961 is the new engine rejection heater which is coupled with the engine cooling system.

## Oldsmobile

*Eighteen different models are available in the full size Oldsmobile line for 1961. Shown is the Super 88 Holiday sedan.*

• OLDSMOBILE OFFERS EIGHTEEN different models in its full-size 1961 line. These incorporate many changes in styling and design; the bodies being completely new for the Dynamic 88 and Super 88 Series and a distinctly different new body for the top line 98. Compared with the 1960 models, the Dynamic 88 and the Super 88 are 5" shorter overall. Although the interior widths remain approximately the same, the exterior widths are 3.8" less. Headroom has been substantially increased in the hardtop models. Overall length of the 98 has been reduced 3" and the outside width of this series has also been reduced 3.8".

Displacement of the Dynamic 88 Rocket engine has been increased to 394 cu. in. from last year's 371 cu. in. for improved performance. The new engine for the Super 88 and 98 has 4-barrel carburetion with a revised induction system, including a new camshaft. It's compression ratio is increased to 10:1 for greater power performance by taking advantage of premium fuels.

An important mechanical change is a completely new light weight Hydra-Matic transmission with a smoother acceleration action which Oldsmobile calls "Accel-A-Rotor". The new unit is slimmer and 75 lbs. lighter than the 1960 Hydra-Matic. It also permits 25 percent reduction in floor tunnel size. Incidentally, the new light weight Hydra-Matic, while giving better performance, has 25 percent fewer parts than its predecessor.

This new model is a larger edition of the model used in the new compact F-85, providing a variable ratio in first in which the car starts with a high accelerating transmission ratio of 3.56:1 that automat-

ically decreases to 2.97:1 before the transmission moves into second gear. This second gear has a ratio of 1.56:1, while third, is direct, 1:1.

Oldsmobile's full size lines have a new guardbeam frame design with box section beams extending the entire length of the frame for increased fore and aft rigidity. Instead of the X-members previously used, new torque box reinforcements brace the four corners of the frame's central section providing box section ruggedness.

The ball joint front suspension has been modified and improved by the addition of permanently lubricated friction surfaces. Front suspension lubrication points have been reduced from 12 to 4 so that periodic lubrication is required only at balljoints.

All Oldsmobiles now have a 7/8" steel stabilizer bar linking the two front wheels for lateral stability. A heavy spring steel rod cushioned at each end by thick rubber mounts, the stabilizer bar equalizes suspension loads between the right and left sides to take out rocking motion and provide flatter cornering. A newly designed 4-link stabilized coil suspension is used in the rear. The upper links are angle-mounted from the rear axle housing to the frame and the lower links are parallel-mounted from the housing to the frame. By mounting the coil springs directly on the axle housing, loads on the links and bushings are reduced.

A new 20 gal. fuel tank is mounted vertically and filled from a door in the rear quarter. This deep tank provides fuel gauge accuracy as well as better venting and filling characteristics. It also provides additional space for luggage. Windshield wiper mechanism provides 3 percent greater wiper area on the Dynamic 88.

## Oldsmobile F-85

*The new Oldsmobile F-85, a six-passenger sedan designed specifically for the low price field. The car is 30 in. shorter than the 1960 "Olds 88."*

• OLDSMOBILE'S F-85 6-passenger job is designed specifically for the low price field. While designed for the smaller, lower price field, it has plenty of reserve passing power, with high fuel economy. As compared with the larger models, Oldsmobile claims 25 percent more miles to the gallon with the F-85. Credit for this is given to the lighter aluminum engine, one reason why the car weighs 1500 lbs. less than the Dynamic 88. Overall length is 182.2" or 30" shorter than the 1960 Olds 88. Built on a 112" wheelbase, it is 71.6" wide and 52.6" high. Oldsmobile's F-85, 4-door sedan and station wagon are also available in the deluxe version.

The new engine for this car is the Oldsmobile Rockette, a water-cooled aluminum power plant, the product of more than 3 year's development work by Oldsmobile and General Motors Research. It is designed to operate efficiently on regular grade gasoline. It has a bore of 3.5" and a stroke of 2.8". The cylinder block is cast from aluminum "356" alloy, also employed for the cylinder heads, intake manifolds, clutch housing and water pump. The cylinder bore liner is centrifugally cast iron. Cast iron is also used for the valve guides, main bearing caps and exhaust manifold. A special hardenable chrome nickle alloy cast iron is used for the camshaft. The crankshaft is Armasteel, a perlitic cast iron produced with a special heat treating process.

Valve gear, cylinder heads and combustion chamber conformation are Oldsmobile designed, the combustion chamber shape being patterned exactly after the Rocket engine. Pistons have chrome-plated top and oil rings.

The dual throat carburetor and the air cleaner are both enclosed in a newly developed carburetor cover for better weather protection and improved silencing. Carburetor bowl cooling is also improved because of the fact that all air entering the cleaner is circulated around the carburetor before it enters the engine. A cold-weather by-pass in the oil pump intake screen assures instant lubrication in severe winter weather.

The aluminum V-8 overhead valve engine is rated at 155 maximum brake horsepower at 4800 rpm. Torque is 210 lb. ft. at 2800 rpm. Power is trans-

mitted through a dual lightweight Hydra-Matic transmission. This new unit is more compact and 95 lbs. lighter than the Hydra-Matic on the 1960 models. (This same design, although larger and with greater capacity is also used on full-size 1961 Oldsmobiles.) The transmission includes a device known as the "Accel-A-Rotor" (fluid multiplier) a new feature for 1961. It is claimed to make operations smoother by providing a variable transmission ratio in first, or starting gear.

The rear axle gear ratio of 3.23:1 is used with the optional Hydra-Matic. With the standard equipment synchromesh transmission, the ratio is 3.8:1. Other mechanical and design improvements include a new frame integral construction. This design gives a strong, but light weight structure and also makes for efficient use of interior space. Also contributing to interior room is the fact that floor tunnel heights have been minimized by the new, smaller Hydra-Matic and use of a newly designed 2-piece propeller shaft incorporating a constant velocity u-joint.

An anti-dive ball joint front suspension is used with coil springs. The entire front suspension is mounted on a separate front cross-member, which is assembled to the body frame side rails but is completely insulated from them by rubber mountings. A new feature of this front suspension mounting is that the steering gear is also carried by the rubber-cushioned cross-member to insulate this unit from road shock.

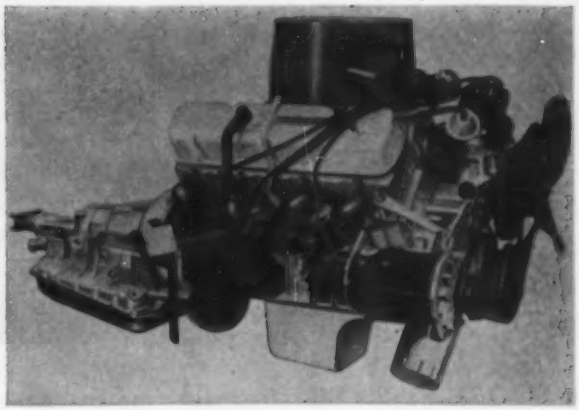
A twin triangle stabilized coil suspension is used in the rear. Two rubber mounted links on each side connect the axle and differential to the body side rail structure. The outer links (between the ends of the axles and the frame) transmit driving and brake forces and also control vertical stability. The inner links (between the differential housing and the frame) are used principally to control lateral stability.

Front and rear brakes are provided with 9.5" drums; the front lining width being 2" and the rear linings 1.75" wide. The parking brake is hand operated and mounted at the lower left end of the instrument panel. Standard tire size is 6.50 x 13, with 7.00 x 13 available as oversize.

The options include a standard synchromesh transmission, with 3.08 rear axle gear ratio or the Hydra-Matic transmission with a 3.23 rear axle ratio. Also optional are two-tone exteriors at extra cost.

The station wagon is a 4-door, 6-passenger vehicle with 75.4 cu. ft. of cargo space. Loading and unloading of this vehicle is remarkably convenient with the rear gate hinged to the roof, lifting above head height making the cargo accessible without leaning over an extended tailgate.

Further options include power steering, although manual steering is judged to be satisfactory on this car. A smaller version of the Roto-Matic power steering unit is available at extra cost. This has an overall steering ratio of 20.8:1 and a gear ratio of 17.5:1. The manual steering gear (standard) is a ball nut design with an overall steering ratio of 26.18:1 and gear ratio of 22:1. Turning diameter is 37 feet.



*Completely new aluminum, water-cooled Rockette V-8 engine, which powers the Oldsmobile F-85. The engine has a maximum brake horsepower rating of 155 at 4800 rpm.*

Also available is a new air conditioning unit. The evaporator and blower elements are mounted inside the car and air distribution is by adjustable side outlets at the ends of the instrument panel. With this design it is possible to introduce fresh air into the air distribution system. Push button controls for the air conditioner are located on the evaporator below the instrument panel.

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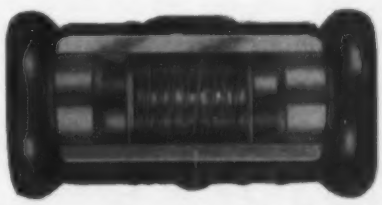

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## Pontiac

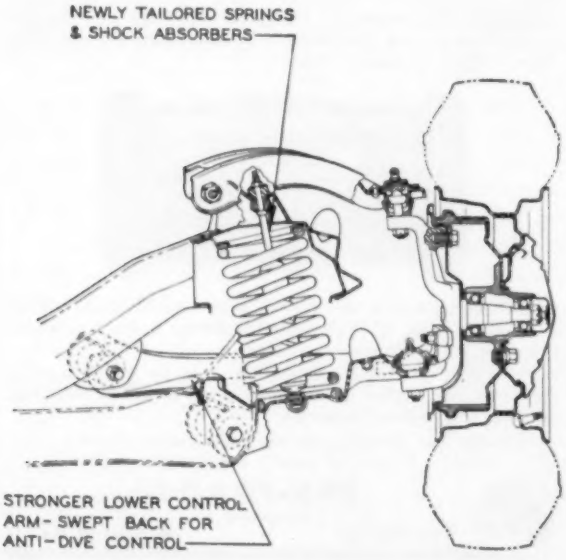
*Pontiac's top-of-the-line Bonneville series offers two and four-door hardtops, a four-door six- passenger station wagon and a convertible.*

● ENTIRELY NEW BODIES with increased passenger space, the new "perimeter" type frame, improved front and rear suspension systems, and a lighter but higher performing "Trophy" V-8 engine are new features in the 1961 Pontiac. The fifteen new models in four series feature new interior and exterior design, improved riding comfort, handling, and performance.

The 1961 Pontiac is as much as .9" lower, 4" shorter, and 2.5" narrower. Overall length of Catalina and Ventura sedan, hardtop and convertible models is 210" with Star Chiefs and Bonnevilles measuring 217". All Safari wagons measure 209.7". Overall height ranges from 54.9" with convertible models to 56.9" with station wagons. All body styles have a maximum overall of 78.2".

Pontiac claims a smoother, softer ride in its new models as a result of changes to front suspension and an entirely new rear suspension system. In the new front suspension design a stronger lower control arm is swept backward for anti-dive control. Springs and shock absorbers are redesigned for maximum softness while still retaining excellent control qualities.

*Details of Pontiac's new front suspension which is said to produce a smoother, softer ride.*




The new full four-link rear suspension system features an improvement in lateral stability, and a softer, quieter ride with less shake. New lower control arms have rubber bushings at pivot points on the axle and frame and are angled inward toward the center of the car for quieter handling ability. Employment of two separate upper control arms, replacing the single arm design, improves lateral stability of the rear suspension, especially during cornering conditions. Upper arms also utilize rubber bushings at points of attachment.

Coil springs are now mounted over the axle rather than forward. A rubber cushion between springs and frame guards against transmission of noise into the passenger compartment. Rear shock absorbers have a new integrated mounting.

Pontiac's 389 cu. in. V-8 engine, now called the "Trophy 425," is available in a wide selection of model variations with many design advances. Standard in Catalina, Ventura and Star Chief models with synchromesh transmission is an 8.6:1 compression ratio, a regular fuel engine with two-barrel carburetor. An 8.6:1 compression ratio, a regular fuel engine with a four-barrel carburetor is standard with synchromesh transmission in Bonnevilles.

Basic engines with Super Hydra-Matic transmissions have a 10.25:1 compression ratio and use premium fuel. Catalina, Ventura, and Star Chief models employ a two-barrel carburetor.

### ENGINE LIGHTER, MORE COMPACT

The new V-8 engine is lighter in weight, more compact and rugged with increased efficiency and smoother operation. In the valve train, diameters of rocker arm studs, balls and retaining nuts are increased for greater strength. New rocker arm balls of sintered iron construction provide larger bearing area. Cast iron cylinder heads of new design and a new aluminum timing chain cover contribute to reduced engine weight.

Pontiac's divided chamber water pump for engine cooling is redesigned to avoid exterior plumbing. The timing chain cover connects with the intake

manifold to eliminate external recirculation passages and minimize possibility of water leaks.

In the new polar mounted exhaust system arrangement, muffler and pipes are located closer to the engine center of rotation for smoother and more durable operation. Exhaust crossover is new, a more direct system for better flow.

Engine oil is supplied from a new 4 qt. capacity oil pan (5 qts. with filter). New fuel tank on all models, excepting the Safaris, have a 25 gal. capacity; Safaris have an 18.5 gal. tank.

New lighter weight, more compact and simplified Super Hydra-Matic transmissions are specified for each wheelbase. Catalina and Ventura models will use a new, three-forward-speed Hydra-Matic transmission. Ir both transmissions a new aluminum transmission case and one-piece integral flywheel housing provide desirable weight reduction.

Manual steering installations utilize a flexible coupling between the gear assembly and the mast jacket and shaft assembly. Similar to that used on power steering installations, the coupling effectively cushions road shock, permits self alignment of the assembly, and enables the gear assembly or mast jacket to be removed independently of each other.

Other significant new features include: distinctive new instrument panels, improved mechanical brakes providing more consistent feel regardless of lining wear; revised clutch linkage for easier clutch engagement; relocation of the spare tire in Catalina and Ventura coupes and sedans for more accessible luggage space; stronger rocker panel sections; better window and door seals; and new tire tread design for improved skid prevention characteristics.

## Pontiac Tempest

*Built on a 112" wheelbase, the Pontiac Tempest features a trans-axle, front mounted engine and a flexible propeller shaft.*

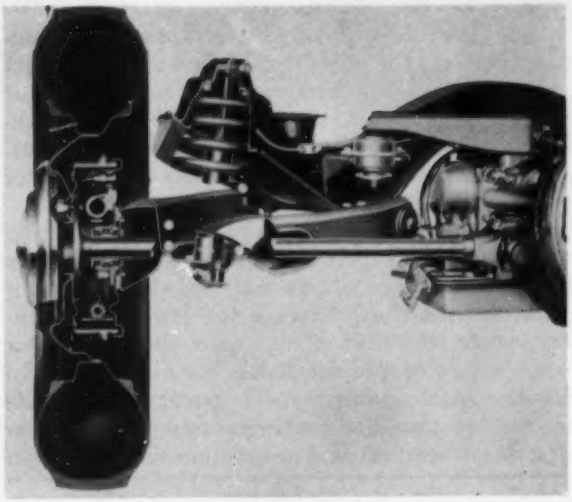
• THE PONTIAC TEMPEST for 1961 is introduced as a 4-door sedan and 4-door station wagon. Built on a 112" wheelbase, the Tempest features a rear transmission (trans-axle) and a front-mounted 4-cylinder engine which delivers the drive to the trans-axle through a flexible propeller shaft—a new Pontiac development. This is the first American-made car with a front engine, rear transmission arrangement and the first car ever designed to use this setup with an automatic transmission.

The interesting feature of the power plant lies in the fact that it is an adaptation of the regular Pontiac V-8 engine but utilizing only the right bank of cylinders. Thus, it presents a slant-type 4-cylinder unit of unique design. The block is inclined to 45°. Other features of the Tempest include: wide track wheels, independent 4-wheel suspension and unit body construction. Standard power is the 195 cu. in. 4-cylinder engine adapted for regular fuel. Since the new engine retains the same components as the regular V-8, it is a short stroke engine. The same main bearings of 3 in. diameter are employed with a harmonic balancer, tin-plated pistons, aluminized valves and hydraulic valve lifters. It has a 4-1/16" bore and a 3¾" stroke. There is an optional premium fuel engine with a 4-barrel carburetor as against the 1-barrel unit in the regular model. Compression ratios are 10.25:1 for premium and 8.6:1 for regular fuel engines.

The engine arrangement with its 45° block provides exceptional engine compartment space, permitting easy accessibility. The exhaust pipe and manifold are on the right side, while the intake manifold, carburetor, fuel pump, generator and starting motor are on the left side. The cast-iron block has three intermediate bearing bulkheads and five main bearings for the crankshaft.

Standard transmission for the Tempest is a manual shift, 3-speed conventional synchromesh. Optional is an automatic transmission. Both are mounted on the differential carrier, achieving one of the major advantages of this type of unit by practically eliminating the floor tunnel. The synchromesh transmission is lubricated in common with the rear axle. The automatic transmission has its own separate lubrication. Synchromesh gear ratios are 2.94:1 in first, 1.68:1 in second and 1:1 in third or direct drive. Reverse is 3.32:1 and the rear axle ratio is standard, 3.55:1; optional, 3.31 and 3.76.

Another Tempest innovation is in the automatic transmission arrangement, which has a torque converter unit employing a "split torque" principle. It



*Trans-axle of Pontiac's Tempest for 1961. Differential and final drive is mounted to the sprung mass of the car.*

is a light-weight, air-cooled, 3-element torque converter, 2-speed planetary transmission with an automatic up-shift, depending upon car speed and throttle position. This transmission is integrated to the differential carrier to form a trans-axle combination. With this arrangement, the torque converter is at the rear of the main transmission unit, separated by the differential carrier. In high gear, the drive is split with approximately 40 percent of the straight drive mechanical and only 60 percent of the torque going through the converter. Pontiac claims that this results in a solid drive "feel" and minimum slip or efficiency loss.

A part-throttle down shift is provided for better low speed performance and acceleration characteristics. At speeds below 25 mph, part throttle downshift to low will occur if the accelerator pedal is moved to approximately one-half throttle. Subsequent up-shifting then occurs at approximately 35-50 mph. For maximum acceleration, full throttle downshift can be attained at approximately 45 mph. Manual down-shift at speeds below 50 mph is provided for over-run braking for use in mountainous country.

Entirely new practice is incorporated in the propeller shaft which connects the front-mounted engine to the rear-mounted transmission. It is manufactured of special quality, triple alloy forged steel, heat-treated and shot peened for high fatigue resistance. The slightly curving propeller shaft is housed within a torque tube of hat-section, heavy-gauge steel that rigidly joins the engine and transmission. The housing is curved to accommodate the shaft and support the bearings, thus eliminating engine torque reaction from the engine mounts and permitting the use of a more flexible engine support.

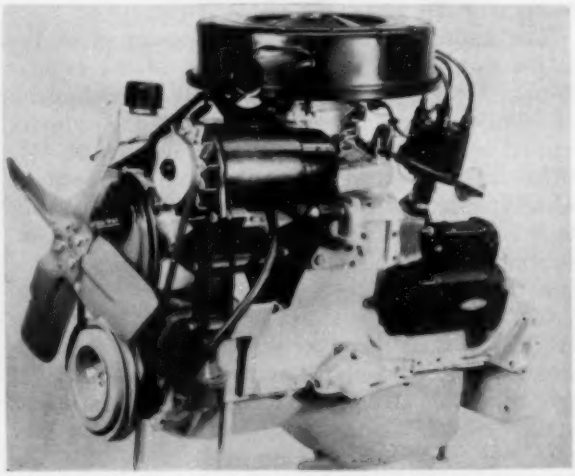
Independent suspension is used both front and rear and designed to minimize unsprung weight. The independent front suspension has an "A" frame-type upper control arm and a cantilever-type lower control arm with compression strut. The unitized front suspension permits closely controlled alignment both in operation and in manufacture. From a service standpoint, the front suspension assembly can be built as a unit, cross-member attachment to the unitized construction body being by three bolts on each side.

Front coil springs are seated on the lower control arm and shock absorbers operate within the coils. To complete the insulation of the body from road noise, tops of coil spring are seated against rubber pads. Ball joints with phenolic seats and anti-dive suspension geometry are incorporated. Front wheel bearings are taper roller type.

The swing axle rear suspension system is one of the unique features of the Tempest design. It has a cross-member attached to the integral body in four positions. Attached to this cross-member is the trans-axle support mounted in rubber for eliminating noise and vibration. This cross member is in turn affixed to the differential in a manner to provide fore and aft shimming for toe variation. The differential and final drive gear case is thus mounted to the sprung mass of the car, the axle shaft being driven through a universal joint on each side of the differential. This eliminates one of the criticisms of the trans-axle of earlier designs which greatly increased unsprung weight.

The Tempest body is of integral construction, with abundant interior space. Both the 6-passenger sedan and station wagon have 112" wheelbase, are 189.3" overall and 72.2" wide. The tread is 57". Overall heights are 53.5" for the Sedan and 54.3" for the wagon. Wheel size is 15" and standard tire size for the sedan is 6.00 x 15 and 6.50 x 15 for the station wagon.

*Four-cylinder engine of the Tempest. It is an adaptation of the Pontiac engine but uses only the right bank of cylinders.*

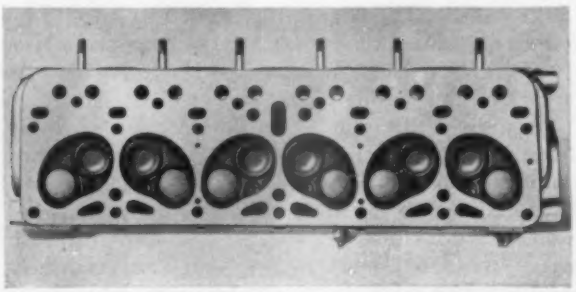


# Studebaker-Packard Corp.

*The 1961 Studebaker Lark hardtop features decorative louvers in the upper rear quarter sections.*

● STUDEBAKER-LARK SIX has a completely new 170 cu. in. overhead valve engine for 1961. The new power-plant develops 112 hp. at 4500 rpm. with a torque rating of 154 lbs. ft. at 2000 rpm. Compression is 8.5:1.

The new engine has been designed to give the Lark a more lively performance than for 1960. The increased power has been accomplished by placing larger valves in a staggered arrangement and increasing the air intake for higher volumetric efficiency.



*Bottom of the 1961 Studebaker Lark cylinder head, showing kidney-shaped combustion chambers and staggered valve arrangement.*

Power output has also been augmented by a new design ram type intake manifold with larger passages in the head and carburetor throat contributing to the greater breathing capacity.

A new kidney-shaped combustion chamber design is claimed to provide smoother operation and to reduce detonation noise to a minimum.

Other new engine features are increased lubrication flow by means of a higher capacity oil pump. Better balance is provided with vibration elimination due to a new fully counter-weighted crankshaft. The camshaft is also a new design with long ramp, low acceleration cams. The long ramp picks up valve clearance more slowly to reduce noise while the low acceleration cam with relatively light weight valve springs lengthens the life of the valve drive parts. The engine is designed to operate efficiently on regular gasoline.

In the drive line, the 1961 Lark Six also features a larger clutch—9⅛" as compared with the 8" clutch for the previous model. There is a new automatic transmission and a new converter available in the 1961 version for smoother shifting characteristics. All Lark models with automatic transmission have an under-hood oil filler tube. Larks are also available with conventional and over-drive transmissions.

Improvements have been made in the steering gear by the use of a newly designed re-circulating ball-type unit. In addition to the new gear, the caster has been changed from 2½° negative to 0° and the knuckle upper bushing is a new precision ground type to reduce friction. The net result is to reduce the steering effort by about 30 percent on 6-cylinder models and by 10 percent on 8-cylinder models. Power steering is also available for the first time

*The five-passenger Studebaker-Hawk sport coupe for 1961, except for refinements, bucket seats, four-speed floor-shift transmission, remains practically unchanged stylewise.*

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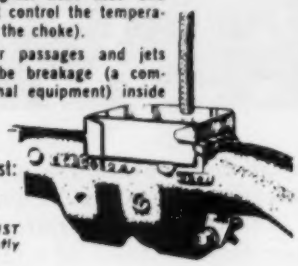

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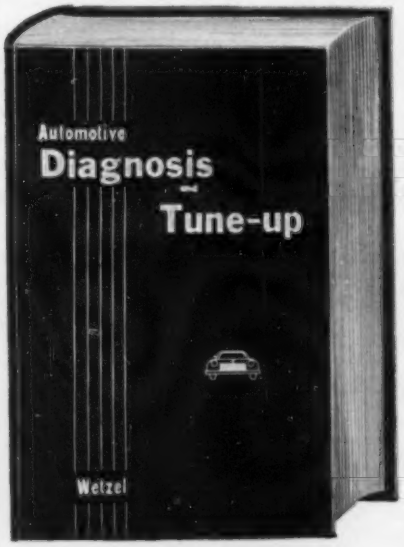


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on all Lark models. Standard features for the 1961 models include combination air cleaners and silencers, butyl engine mountings, heavy-duty crankshafts and automatic chokes.

All Larks destined for California delivery are equipped with forced crankcase ventilation to prevent emission of unconsumed fuel elements. Gasoline fumes that by-pass the rings into the crankcase are piped back to the intake manifold to be burned in the cylinder combustion chambers.

A wide range of options or rear axle ratios are provided for performance suitable to any type of driving condition and terrain.

### *Studebaker-Hawk*

• THE STUDEBAKER-HAWK retains its classic "Gran-Turismo" sports car styling for 1961. However, bucket seats have been added and there is now a 4-speed transmission with floor shift.

The 289 cu. in. power plant develops 210 hp. at 4500 rpm with a torque rating of 300 ft. lbs. at 2800 rpm. With optional four-barrel carburetor, the engine develops 225 hp. at 4500 rpm and a torque rating of 305 ft. lbs. at 3000 rpm. The compression ratio is 8.8:1. The engine is designed to operate on regular gasoline.

There has been an increase in brake lining area. In addition, new bonded brake linings are claimed to give approximately a 75 percent increase in lining life. Finned, weather-seal-type brake drums, designed to offer more rapid cooling, are standard.

In addition to the new optional 4-speed transmission with floor shift, Hawks are also available with either standard, over-drive or automatic transmissions. Optional features include power brakes, power steering, air conditioning, limited-slip differential and automatic hill holder for both manual and overdrive. Offered also for Hawks are tachometers and deck-lid mounted radio antennas. Other standard Hawk features include a padded instrument panel, heavy-duty transmission, a 10½" clutch and box-section, ladder-type frames.

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# These are new *manufacturers' products*

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If you want further information or literature describing the products shown in our "These Are New" pages, just use the handy Business Reply Card you'll find further back in this issue. Whether you want information on one or more of the products, all that is necessary is to mail this Postage paid card properly filled out to AUTOMOTIVE SERVICE DIGEST. Our Reader's Service Dept. will contact the manufacturers directly and see that you obtain the requested information as quickly as possible.

## Valve Seat Inserts

A complete new line of valve seat inserts has been added to the McQuay-Norris Mfg. Co. replacement parts line.

The insert line consists of three different types—gray iron, hardened alloy, and stainless steel. The inexpensive gray iron inserts are the most widely used. Hardened alloy inserts are of higher quality and will give longer life under more difficult operating conditions. The stainless steel inserts are of premium quality, designed for heavy-duty use, and are recommended for use where hard faced valves and chrome top rings are needed.

These inserts are listed by number and by dimensions, thus making it easy to select the right insert for the job. Box labels show I.D. and depth of seat, plus counterbore diameter of recess (cutter size).

(Circle No. 1 on Reader Service Card)

## Starter-Ignition Switch

From under the hood or under the car, the new Model SIS (starter *and* ignition switch in one unit) available from Simpson Electric Co., permits the mechanic, by remote control, not only to crank the engine but to start and run it and stop it, at will, without entering the car to turn the ignition key.

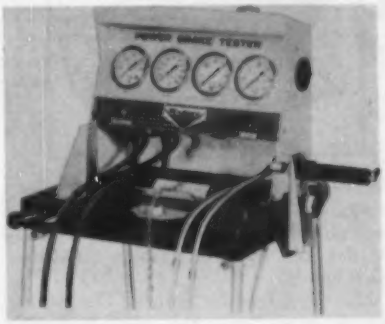
According to the manufacturer, the switch is invaluable for such jobs as: gapping distributor points, setting the dwell angle, compression testing, rotating the converter in automatic transmission work, testing fuel pump output and many other operations.

The SIS is neat, compact, rugged and easy and fast to operate with one hand. The switch body fits the hand comfortably and is of high-impact plastic which is said to withstand being dropped on the cement floor and stepped on. The body contains 2 switches: an ignition switch with "on" and "off" positions indicated in a window in the body, and a separate, momentary contact switch for starting the engine or for bumping it over. The unit is fused so that distributor breaker points are protected in case a wrong hook-up is made.

(Circle No. 2 on Reader Service Card)

## Power Brake Tester

The Parts and Accessories Division of Wagner Electric Corp. announces the Wagner Lockheed Power Brake Tester which, with adapters, can measure hydraulic pressure and vacuum on various makes of power brake units. The tester may be used as bench equipment or used to test brake units on the vehicle.



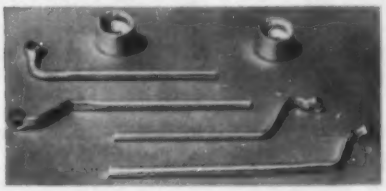
A mobile cart, available as an accessory, facilitates using the tester on the vehicle. A vacuum pump is available for use when the vehicle's vacuum is not used in testing power brake units.

(Circle No. 3 on Reader Service Card)

## Ball-Joint Socket & Wrench Set

Hunter Engineering Co. announces their L6-S ball-joint suspension socket and wrench set for servicing ball-joints and making caster and camber adjustments easier on deep-set adjustment-setting points.

The L6-S set includes two sockets for removing and installing ball-joints on Chrysler-built cars, and four wrenches for adjusting caster and camber on Ford, Mercury, Lincoln and Rambler ball-joint suspensions. The long-life wrenches are made of high quality forged-steel, and are fully guaranteed against breakage.

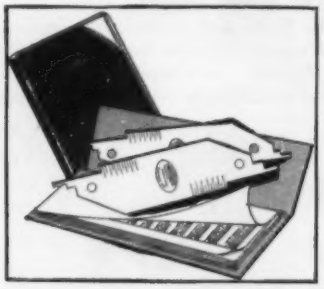


(Circle No. 4 on Reader Service Card)

# These are new *manufacturers' products*

### Valve Spring Tension Gauge

A new wallet-sized kit is said to let any mechanic do a 100% accurate job of measuring the exact amount of shimming needed to restore original factory-specified valve spring tension



on re-ground or worn valves. No disassembly is needed, and it is stated that only five minutes are required to do the job, even on double counterbore heads.

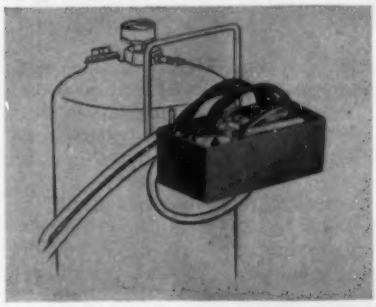
Manufactured by Houser Engineering & Mfg., Inc., the new No. 665 Valve Spring Gauge Pocket Kit instantly shows how much material has been lost, and which valve spring shims (.020" or .035") are needed to restore it.

One side of the leather-like plastic kit holds two life-time steel Houser Valve Spring Gauges in transparent pockets for easy selection. The other side contains a quick-reference Selector Chart for determining proper gauge setting and shim requirements. Large, easy-to-read tables show all popular passenger car, farm tractor, truck and commercial applications.

(Circle No. 5 on Reader Service Card)

### Brake Bleeder Tank

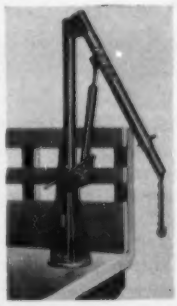
EIS Automotive Corp. recently announced a new No. T1200-7 bleeder tank which incorporates a hanging tool tray for bleeding tools and fittings. It also features a quick-disconnect fitting as well as a complete set of adapters which includes those for servicing 1960 Ford product passenger cars, 1960 GMC and Chevrolet trucks. The quick-disconnect fittings include one female and two male adapters.



(Circle No. 6 on Reader Service Card)

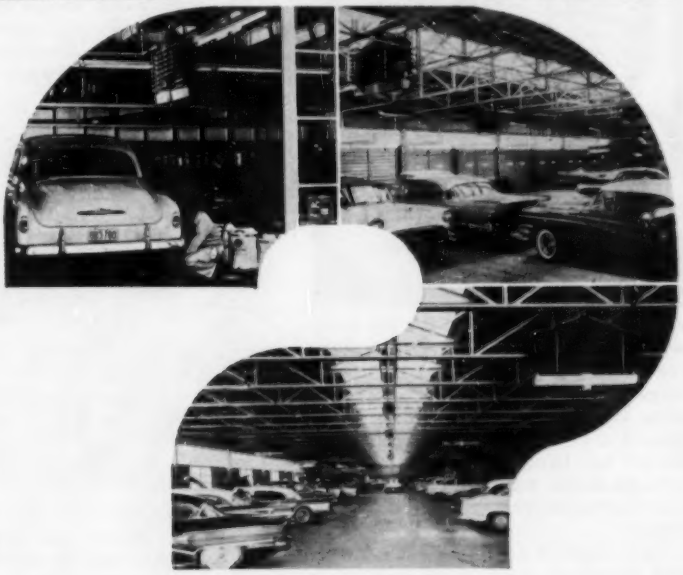
### Truck Mounted Crane

An inexpensive half-ton, hydraulic-powered crane, designed primarily for use on service and delivery trucks, is announced by Edgewater Automotive Division.



The new "Fleet" crane features an adjustable telescoping boom which locks in three positions, from 38" to 57½". When the crane is not in use, the boom folds


# Want To Save On Shop Heating Costs



Then by all means write for information on what PANELBLOC gas-fired infra-red heaters can do for you. Panelbloc actually "Heats Like The Sun." It generates healthful rays (as the sun does) that radiate downward, warming everyone and everything in its range. Panelbloc warms floors, tools, work benches and your mechanics.

Panelbloc is low in first cost, easy to install and keeps fuel bills down. No fans, motors or blowers. No moving parts — nothing to wear out! Safe, silent and efficient — needs no electrical connections! AGA and UL approved for LPG or city gas.

**Write for Bulletin PC 1-60 L**

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**The Bettcher Mfg. Corp.**
**3106 West 61 St., Cleveland, Ohio**

down against the mast to occupy minimum space.

The mounting wells may be installed on the deck of delivery or service trucks or on loading platforms, at machine tools or throughout the shop where heavy lifting is done. Extra mounting wells are available, permitting multiple use of a single crane unit.

(Circle No. 7 on Reader Service Card)

### Parts Cleaner

In the new Wi-To-Co parts cleaner, recently announced by the Winona Tool Mfg. Co., cleaning fluid flows through a nylon brush, a steel brush, and a flexible spout to make parts cleaning easy and fast. A three way

valve directs cleaning fluid through either of the two brushes or the spout. All three are mounted on flexible arms. Fluid flows through the center of the tough nylon brush flushing away dirt and grease without splashing as the part is washed. The steel brush with fluid flowing through the center is for heavy cleaning and baked on grease. A basket with a mesh bottom, makes it easier to clean, and harder to lose small parts.

Eighteen filtering pans, each 19" in diameter and ¼" deep give a total of 4,590 sq.in. of cleaning fluid settling surface. Clean fluid is skimmed off the top and goes through a final, extra-large, waste filter. The system is powered by a sealed motor and pump.

(Circle No. 8 on Reader Service Card)

### Polarity Tester

A new spark plug polarity tester for determining preferred polarity on engines with either battery or magneto ignition is announced by the Fox Valley Instrument Co.

Designed for low cost and maximum simplicity in use, the tester features two small electrodes inside a miniature neon lamp on the face of a cylindrical plastic container. Terminals at each end of the container permit connection to the distributor and to the high tension coil wire for testing battery ignition engines. If the electrode nearest the coil glows, preferred polarity exists. If the other electrode glows, the two wires at the primary terminals of the coil must be reversed to achieve preferred polarity. If both electrodes glow, an over-wide plug gap or weak coil is indicated.

(Circle No. 9 on Reader Service Card)

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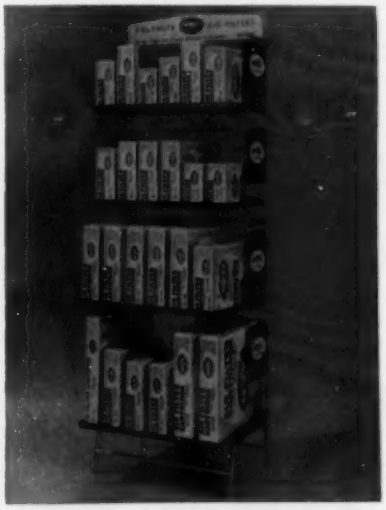
# These are new *manufacturers' products*

### Air Filter Merchandiser

A practical answer to the problem of maintaining an orderly stock of air filter cartridges is announced by Wix Corporation. The basic design of the Wix-O-Matic Wall Rack and Floor Cabinet provides maximum versatility, according to the manufacturer. The wall rack, with two demountable shelves will accommodate twelve cartridges ranging in size from the smallest to the largest. Two wall racks, hung side by side, can be arranged so that one will hold the smaller sizes and the other the large ones by simply changing shelves. Bolted one above the other and mounted upon a base of aluminum tubing, the racks form a floor display housing a broad range of stock of 24 cartridges.

The air filter merchandisers include



all Wix-O-Matic items of automatic stock control, instant cartridge identification, wide coverage with minimum inventory and guarantee against obsolescence, the company states.

(Circle No. 10 on Reader Service Card)

Stant RADIATOR CAPS - GASOLINE CAPS
EVRSEAL - EVRLOC - DUAL-LOC
R-9
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Standard of the industry and original equipment for a generation
STANT
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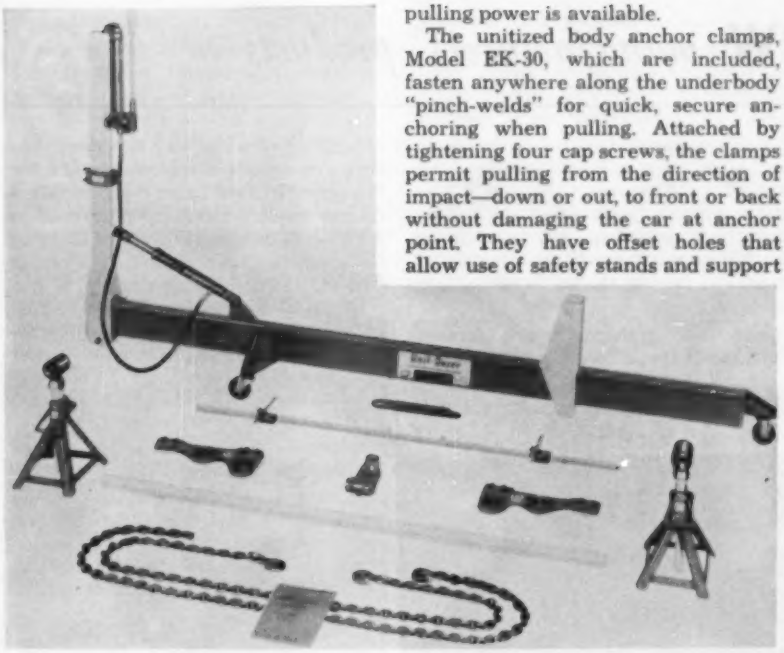
### Heat Control Valve Lube

Part-Ease manifold heat control valve loosener and lubricant, a new specialized lubricant by American Grease Stick Co., is said to assure free and easy operation of manifold heat control (or heat riser) valves and carburetor air duct valves.

A specifically recommended point of lubrication in all lube charts, the heat control valve must operate freely. If not, slow warm-up, poor acceleration and burnt spark plugs may result.

Part-Ease is recommended by the manufacturer for use with every lube job and engine tune-up. It is said to cut through the rust, lead, carbon and gum deposits that cause valve shafts to stick and bind, leaving a colloidal graphited, heat resistant, anti-rust lubricating film that lasts for the life of a lube job.

(Circle No. 11 on Reader Service Card)



## Body-Frame Repair Equipment

Blackhawk Automotive Division's new portable Unit-Dozer is especially designed for correcting damage by pulling from the point of impact on any unitized automobile construction as well as straightening a major share of frame damage. The basic unit has gauges, clamps, safety stands, support tube and chains.

Key feature of the new machine is an adjustable, self-locking anchor post that slides along the entire length of the unit's horizontal beam. By moving the anchor post to a desired position, the operator can pull damage from a point as close as six inches from the the car. Up to ten tons of hydraulic pulling power is available.

The unitized body anchor clamps, Model EK-30, which are included, fasten anywhere along the underbody "pinch-welds" for quick, secure anchoring when pulling. Attached by tightening four cap screws, the clamps permit pulling from the direction of impact—down or out, to front or back without damaging the car at anchor point. They have offset holes that allow use of safety stands and support tube for raising the car off the ground.

The extent of damage can be assessed quickly and accurately with the Model EK-326 Tram-Track gauge. Measurements can be read directly on the gauge without moving it from under the car.

The new Model EK-81 pull clamp permits pulling body metal from a variety of positions and angles, including sideways. Made of high-alloy steel, the clamp is a vital part of the repair unit in roughing out damaged body sections. Heat-treated teeth (pat. pend.) are four inches wide and by means of a pull pin, grip tighter as more pressure is applied.

(Circle No. 12 on Reader Service Card)

## Small Motors Service Center

A sturdy 16-compartment metal visible-stock cabinet with 15 O.E.M. small automotive electric motors for heater and defroster replacement needs simplifies the small servicemen's operations. Called the O.E.M. Uni-Fit "Service Center," its 15-motor assortment serves 90% of car and truck needs, according to O.E.M. Products Co. By easy adaptation of shaft rotation, length and diameter of the motors, this small stock of most widely used numbers covers most requirements. All ¼" shaft motors are furnished with A.S. type adapters to convert to 5/16" diameter shaft. A wiring instruction sheet is also included with each motor.

The unit stands firmly on counter or hangs on wall. The sixteenth compartment allows for an extra motor in addition to the well-balanced stock assortment.

(Circle No. 13 on Reader Service Card)

Say You Saw It In
Automotive Service Digest

## Compact One-Piece Tachometer

The Sun Electric Corp., Tachometer Div., announces a new Model FZ one-piece Electric Tachometer that is said to accurately measure readings in the 8,000 to 10,000 r.p.m. range.

According to the manufacturer, a new Zener stabilized circuitry produces contant voltage and thereby more accurate r.p.m. readings under all driving conditions.

Particularly adaptable to use in hot rods, sports cars, dragsters, and outboard marine motors, the tach measures only 2-9/16" deep (front to back) with large easy-to-read dial, 3-11/32" in diameter. Chrome mounting bracket is also available for top of instrument panel or steering column where tachometer cannot be set into dash.

(Circle No. 14 on Reader Service Card)

## Visualiner Background Changed

John Bean announces the redesigning of its Visualiner background; the new background being standard equipment for all Visualiner wheel alignment department installations.

The new cabinet-type background is designed in red and white with black trim. An attractive fully lighted transparent plastic section extends the entire width of the unit. Large screens for image projection and storage cabinets for tools and small equipment are built-in features of the new background.

(Circle No. 15 on Reader Service Card)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# These are new *manufacturers' products*

### Replacement Generators

Twelve factory built generators that replace well over 200 original equipment and service types covering practically all makes of passenger cars produced in the past ten years are now being marketed by The Electric Autolite Co.

Included in the new Universal Generator offer are seven 12-volt and five 6-volt generators to solve replacement problems, at a competitive price, on most Ford, Chrysler, G.M. and Studebaker cars, as well as many trucks, built in the past decade. In addition, most Willys and American Motor cars produced during the same period are covered.

The new generators are factory built and are offered without core charge, eliminating any investment in cores or return shipping charges for the same. In most cases the generators do not require auxiliary parts and in all cases are easy to install. In most instances they can be used with original equipment regulators.

Of prime importance is that factory built Universal Generators do not require an exchange, hence the dealer does not risk any penalties for damaged exchange merchandise.

(Circle No. 16 on Reader Service Card)

FOR PIN FITTING

On today's engines—absolutely essential for press-fit type rods.

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Guarantees manufacturer's original specifications on reconditioned rods.

Dial of AG-300 Gage shows hole size in tenths of thousands Gage range .375" to 3.375".

**Is YOUR work now being done by a Jobber Shop which has the latest Rod-Reconditioning, Pin Fitting and Gaging Equipment? Precision Machine Shop Work helps build YOUR reputation and protects YOUR Profits.** A—100R

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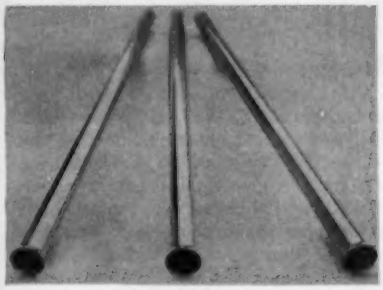
### Scavenger Exhaust Pipes

A new line of scavenger exhaust pipes, of the type which has become popular with customized car owners, is being manufactured by Durachrome, Inc., makers of Thundertone Products.



Called "Jet-Flo Scavengers" the long, straight, heavy-duty chrome plated steel construction and bell-tip design enables the pipes to dissipate exhaust quickly and eliminate back pressure, for increased engine performance, the company states.

The pipes are installed immediately behind the muffler and are available in the popular full 36" and 48" sizes in 3 diameters from 1¾" to 2¼". Jet-Flo "Shorties" in 7, 9 and 14" lengths with the same "bell-tip" ends are also available.

(Circle No. 17 on Reader Service Card)

### Big Four Car Washer

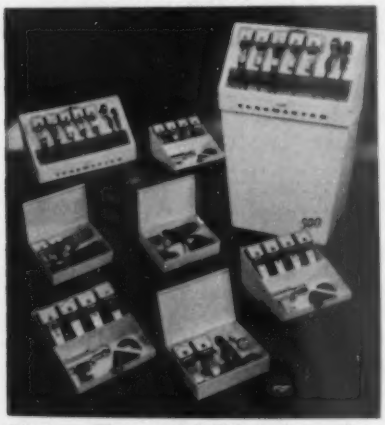
Big Four Industries, Inc., announces a power-spray car washer (standard or heavy duty model) which is said to clean everything—buildings, trucks, motors, lubrication lifts, rest rooms, tractor bodies, gas pumps, and driveways—in addition to washing car bodies and upholstery and glaze coating engines.

(Circle No. 18 on Reader Service Card)

### Tune-Up Kits

A new line of engine tune-up kits for specialized chores in automotive, marine, truck and tractor tune-ups, is now available from Kal-Equip Co.

For the shop that wants a complete tune-up department, Kal-Equip has assembled its entire line of hand held tune-up tools in its Model 500 Tune-



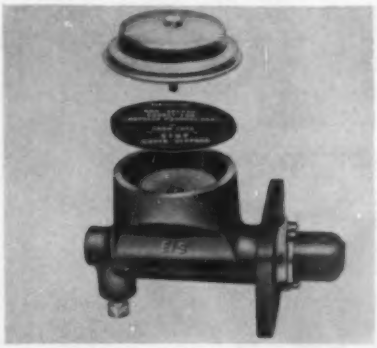
Master. The Model 500 is housed in a white enameled roll-away stand, and will perform all of the steps of complete engine analysis. The testers are also sold as individual units.

An important advantage claimed of the Kal-Equip line is that each hand held tester can be used independently of the others, allowing several tune-up jobs to be done at the same time. Each tester has been designed for simplicity and easy use. No factory training is required and each tester comes with an illustrated instruction booklet.

(Circle No. 19 on Reader Service Card)

### Master Cylinder Gasket

A specially designed no-splash gasket (W1370) for use on Chrysler Products from 1955 thru 1960 is now

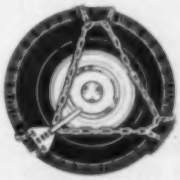


available from EIS Automotive Corp. The new gasket prevents cover seepage of brake fluid thru the vent and at the same time creates a correct seal between the cap and the tank.

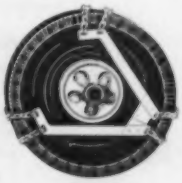
(Circle No. 20 on Reader Service Card)

### Clip-on Tire Chains

A new tire chain that the manufacturer claims can be installed or taken off in 15 seconds or less has been developed by the Stava Mfg. Co.



Outside of Wheel



Inside of Wheel

Chain consists of heavy gauge steel "V" with links attached. Chains are installed by holding chain in one hand; "V" in the other hand is inserted behind wheel, with axle and brake drums between prongs of the "V." Loose ends of inside chain with fastener-plate is pulled around tire tread. Prong on outside chain is inserted in opening on fastener-plate and chains are locked in place.

According to manufacturer, these Wahoo Clip-On Chains can be installed even when wheels are rim-deep in mud or snow, without jacking up wheel.

(Circle No. 21 on Reader Service Card)


# TORQUE WRENCHES

*These are the same torque wrenches used and recommended by leading engine and equipment builders.

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Say You Saw It In
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• ONLY ASD provides the automotive service field with timely, authoritative, detailed articles of this type. Prepared by men who have the actual experience, as well as the education to "live with" the increasingly specialized service needs of the modern automobile, these features go deeply into the methods and mechanical parts involved. Most "Tech Know-How" write-ups are step-by-step "how-to" descriptions of the latest procedures in a key servicing operation.

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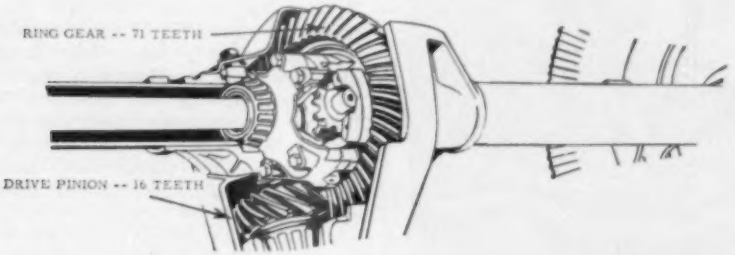
You need ASD to keep fully informed—and get your fair share of the benefits from technical advances. USE THE CONVENIENT POSTPAID CARD ABOVE TO ENTER OR EXTEND YOUR SUBSCRIPTION—TODAY.

BRUSHING UP ON THOSE EASY-TO-FORGET THINGS

# Refresher course

## ✓ *How gear ratio is measured*

• Rear axle gear ratio is the number of times the axle revolves in relation to one revolution of the propeller shaft. The gear ratio is arrived at by dividing the number of teeth in the ring gear by the number of teeth in the drive pinion.




For example, if the ring gear has 71 teeth and the drive pinion, 16 teeth, dividing 71 by 16 equals 4.43. Thus, the ring gear revolves 1 rpm to 4.43 rpm of the drive gear. It is called a ratio of 4.43 to 1.

Transmission gear ratio considers the ratio between the engine crankshaft and propeller shaft. Thus, in direct drive or "high" the ratio is 1 to 1, since the engine and propeller shaft revolve at the same speed. In "low" with a conventional transmission, the gear ratio may be, for example, 3.12. Then, to get the total gear reduction the transmission ratio is multiplied by the axle ratio, in this case 3.12 times 4.43 which gives 13.84. This means in "low" gear the engine (and drive pinion) revolves 13.84 times for every revolution of the rear axle. In the same way, multiplying the transmission gear ratio for intermediate and reverse by the axle ratio gives the total gear ratio.

## Tool Tips *for the Mechanic*

**Vauxhall Wiper Nut**

Try SNAP-ON® S-9540A Windshield Wiper Socket when working on the '58 and '59 Vauxhall wiper transmission. This socket was originally developed for the same use on 1955-60 Chevy and Pontiac lines. Page 77 of SNAP-ON Catalog X.

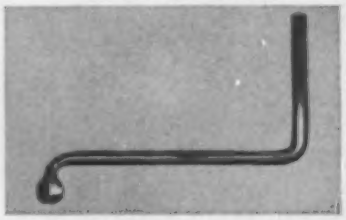
**Chrysler Steering Wheel Shaft Bearing**

Chrysler mechanics — tuck this tip in your tool box: the SNAP-ON S-9094A Cotter Pin Puller makes a simple task out of pulling the bearing on the upper worm of the steering wheel shaft on all Chrysler line cars. Page 65 of Catalog X.

**Power Glide Transmission Work**

Here's a tip for mechanics who use the SNAP-ON S-8672C and S-8673A Ford Drive Shaft tools. The same units will pull and insert the rear transmission bushing and seal on Power Glides — '58 to '60. If you don't own them, check your SNAP-ON man — details on page 70 of Catalog X.

**NEW TOOL**



**Snap-on S-9467B**

**Chrysler Line Distributor Wrench**

SNAP-ON has made it easier and faster to loosen or remove the distributor on Chrysler line cars — including the Dart and Valiant. This 7/16" double hex BOXOCKET® is made to reach around the distributor. Tool length is 7¼". For extra use, try it for removing Edsel and Mercury distributors. Your SNAP-ON man will show you how it works — ask him next time he's in your shop. See page 83 of Catalog X.

**Vauxhall Brake Service**

Another tip for foreign car mechanics: the S-9542A Brake Bleeding Wrench (page 85 Catalog X) originally designed for GM and Ford cars, can also be used for adjustments on Vauxhall brakes. The work is even easier if SNAP-ON TMD-10 and TM-408 sockets are also used on the rear shoe of the front wheels. Check page 21 of Catalog X.

SNAP-ON makes a specialty of keeping up with new cars — and modifying old tools for new uses. Best guide for tool value is your SNAP-ON catalog — ask for your copy.

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## Spokes . . .

*(Continued from page 10)*

**The U. S. Army** is going in for extended use of aluminum for light weight truck transportation. The revolutionary XM-410, the army's floatable 2½-ton cargo truck, has recently completed a grueling 10,000-mile reliability run. The 8 x 8 truck required only one non-scheduled stop and four quarts of added oil along the 22-state route which covered all types of roads, altitudes and temperatures—from the 120 degree heat of Death Valley, California to the 11,000 feet mountain passes of Colorado.

Fully loaded with 5,000 pounds of payload, this light-weight, 2½-ton, 8-wheel-drive truck weighs less than the army's present 2½-ton, 6 x 6 empty. It is 2½ feet shorter, can be dropped from the air and can swim obstacles without advance preparation or kits. Because of its independent suspension and large low pressure tires, it has cross-country ability comparable to tanks.

* * *

**The State of Kansas** took good care of its troopers during the hot weather. During the summer the state purchased 25 new 1960 Plymouths with air conditioning for the troopers doing patrol work on the Kansas Turnpike. "Air conditioning was ordered to improve the efficiency, safety and morale of the Kansas State Troopers who operate the patrol cars," Gale Moss, Kansas Turnpike general manager, said.

* * *

**Champion Spark Plug** has developed a new type of mobile service vehicle, which has already started making the rounds of automotive repair shops and garages throughout the country. These trucks are completely equipped engine analysis laboratories on wheels. Each truck contains equipment which can be used to simulate most of the conditions causing trouble in automotive ignition systems. It is capable of visually demonstrating the adverse effects resulting from these conditions to an audience of several hundred people.

The trucks are also fitted out with complete trouble shooting equipment for service purposes. They carry a distributor tester, dwell tachometer, coil tester, exhaust analyzer, oscilloscope and other service equipment. One of the features is a demonstration of what happens to spark plug operating temperatures when plugs of an improper heat range are installed. By means of a thermocouple which meas-

ures actual spark plug temperature, an audience is enabled to watch the temperature changes at the spark plug's firing end shown on a large viewing screen.

* * *

**Ford Motor Co.** is attaching considerable importance to the use of pelletized iron concentrates produced from low-grade ore. Humboldt Mining Co., which is jointly owned by Ford and Cleveland-Cliffs Iron Company, located near Marquette, Mich., recently made a 14,000-ton shipment of pellets to be used in the Ford Rouge blast furnace. The importance of the pelletized products is that when accessible reserves of other ores are depleted, this process can provide economical recovery of iron from much greater reserves of low-grade, non-magnetic ores, according to Irving A. Duffy, Ford group vice president.

* * *

**According to** Charles M. Heinen, Assistant Chief Engineer of Chrysler Corporation Engineering Division's materials laboratories, tests show that 20 per cent of brake fluids are below the minimum safety standards set by the Society of Automotive Engineers. A similar test made in 1955 showed that conditions at that time were much worse than today. However, in the tests recently completed, 15 out of 75 brands were below SAE standards.

Twenty-six states, plus the District of Columbia now have laws which permit the sale of only SAE type 70 R heavy-duty brake fluid. In addition, 12 of these states require the registration and certification of brake fluids to assure the public that it is obtaining fluids conforming to minimum SAE standards. Additional states will have similar laws after January 1, 1961.

"C'mon now, Jackson. It isn't necessary for you to say a prayer everytime we lower a body!"

**Ford has instituted** a program on a test basis aimed at attracting, training and placing qualified young men in the service departments of the Ford dealerships. Involved in the program are a group of leading technical high school instructors to be trained in approved service techniques. Instructors in turn will train interested senior year high school students throughout their final school year. Whenever possible, students will be employed on a part-time basis in dealerships during the school year. Upon completion of the course, students will be offered employment with dealers as apprentice service technicians. The pilot program is being conducted in eight of the Division's 36 sales districts.

* * *

**Along with the** recent announcement by Ford of its extended oil change period (and similar announcements expected from other makers), it is interesting to note that at a recent meeting of the American Chemical Society it was declared that a permanent engine lubricant is "a definite possibility." The lubricant is a silicone fortified with iron, copper or cerium, added in a special way to increase the length of the life of the silicone from 100 to 1,000 times, said Dr. W. A. Zisman, Naval Research Laboratory. The lubricant has been produced by Dr. H. R. Baker and Dr. C. R. Singleterry, both of whom are connected with the Naval Research Laboratory.

## Power Loss or Surge

If a Falcon owner complains of power loss or power surging, the cause will probably lie in the fuel system or ignition system, according to the Ford Motor Co. A clogged or defective flexible fuel line, a clogged fuel pump filter, a plugged vent in the fuel tank, can all be causes of this complaint. Also, an improperly formed spring on the distributor rotor (set too low) introduces a resistance in the ignition secondary circuit that can cause an engine to misfire. The spring must be flush with the upper surface of the rotor body or up to 3/64" above flush when viewed from the side.

## Torque Tightening Specs

A recent Plymouth-DeSoto-Valiant Service bulletin states that torque tightening specifications for the drive plate-to-torque converter screws on Plymouth 6-cylinder and Valiant cars with automatic transmissions has been increased from 200 in. lbs. to 270 in. lbs. It is important that the new torque specifications be used when attaching the drive plate to the torque converter.

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Bigger Profits thru faster easier lifting operations. Handles car for all types of front and rear end work. Jacks easily adjusted. Branick quality features insure years of safe dependable service.

**BRANICK MFG. CO., Inc.**

FARGO BOX 1937 NORTH DAKOTA


**Ford Motor Company . . .** *(Continued from page 46)*

er option for all Mercury models except the low-priced economy 600 series. Bore of this engine is 4.05" and stroke 3.784". Compression ratio is 9.6:1 with premium fuel recommended. Horsepower is 300 at 4600 rpm, torque 427 ft. lbs. at 2800 rpm. Other features of the 390 engine are: cast aluminum front engine cover for better sealing and a rigid mounting for the vacuum booster pump.

Slipper-type pistons are used with a dish-type dome. Dual valve springs with secondary damping spring wound in opposite direction to the valve spring are also standard. The Ford anti-smog emission reduction system, while standard on this engine, will be available as optional equipment on all other Mercury engines. While some Ford products have gone to a 6,000 mile oil change interval, Mercury retains its 4,000 mile recommendation.

The 1961 Mercury transmission program includes the manual 3-speed transmission, overdrive with manual 3-speed transmission, 3-speed Merc-O-Matic, and Multi-drive Merc-O-Matic.

The Multi-drive transmission uses a new system of shift control through vacuum throttle valve controls. A shift-control vacuum-cam assembly and transmission shift timing are built in at the factory.

### "CUSHION-LINK" SUSPENSION

Introduced for 1961 is what the Mercury engineers term a "cushion-link suspension" which applies to all four wheels. Although the 1961 wheelbase has been reduced some 6" below the 1960 model, it is claimed that the cushion-link gives the car a distinctive "big-car" feel.

Cushion-link allows the initial shock of road irregularities to be absorbed more completely in the suspension members, instead of transferring them to the frame and body. The new principle allows the wheels to move rearward as well as upward to absorb shock in any direction.

The front-suspension cushion-link is located at the front pivot of the lower arm. Instead of a single pivot pin, the cushion-link has two pivot pins and a shackle arrangement. The upper pivot pin provides for the normal vertical movement of the wheel. The lower pivot pin allows the arm, together with the wheel, to move rearward when horizontal forces are applied by bumps in the road. A large elliptical rubber bushing surrounds the upper pin to control and absorb the horizontal movement. Thus, the elliptical rubber functions as a shock absorber. Acting in this manner it offers increasing resistance as the load increases. The system of forces in the linkage holds the shackle in neutral center unless disturbed by bumps in the road.

The rear suspension cushion-link incorporates a new tension shackle in the front anchor of the rear spring. Control and amount of movement is ob-

tained by an extended arm on the shackle which is mounted in rubber. An increased amount of rubber at this point and also rubber bushings surrounding the pivot point decreases the transmission of road noise into passenger space. The cushion-link system will be used on all Mercury models, except the lowest priced line. Advantages claimed for it are: All four wheels have the ability to recede in any direction to completely soak up road irregularities. It is sensitive to very light shock load, such as tar strips, yet offers increasing resistance as the load or shock increases in intensity.

Mercury bodies for 1961 are better protected against rust. The rocker panels are now galvanized. Weld sealers and primers are used between parts which are welded together to provide a protective coating in areas where moisture is slow to evaporate. A 5-step cleaning and rust proofing of the entire body precedes priming and painting.

Added options include a power transfer rear axle which is a locking differential providing even power to both rear wheels. When one wheel looses traction, the differential action is restricted by the engagement of a constantly pre-loaded clutch. The clutch consists of two friction-coated steel plates. The outside steel plates apply constant pressure against the friction plates by means of a spring washer between the differential case and the outside steel plates.


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- Zero to 90° positive stop — and minus one degree setting
- V-ways with automatic take-up for wear
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The only valve refacer that offers all automatic pre-load compensation for wear. No mechanical adjustments necessary, or expensive service or parts replacement. Machines retain original fine accuracy throughout years and years of service.

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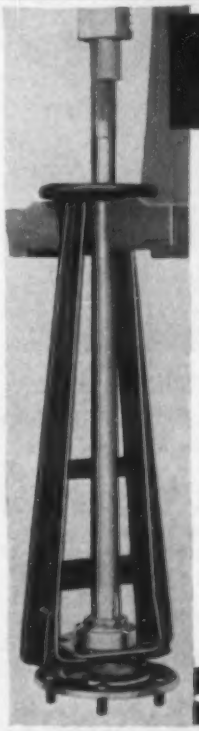

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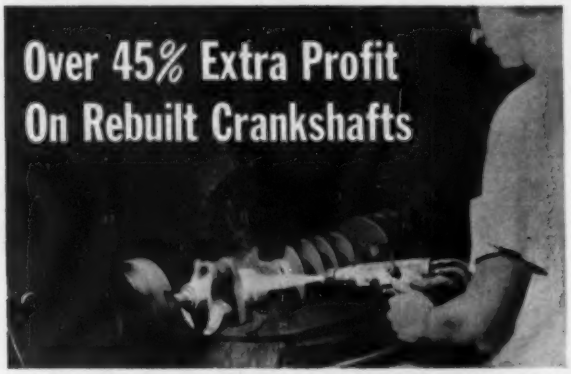
Sprague DEVICES, INC.
MICHIGAN CITY, INDIANA

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Engine Rebuilders Corporation of America, Fair Lawn, New Jersey, reports that with Colmonoy C-290, a special purpose alloy high in nickel and chromium, they turn out 23 to 27 crankshafts per day as compared to 16 to 18 per day with older wire metallizing method. Not only are labor costs lower, but costs for material also are less. Customer reaction has been excellent.

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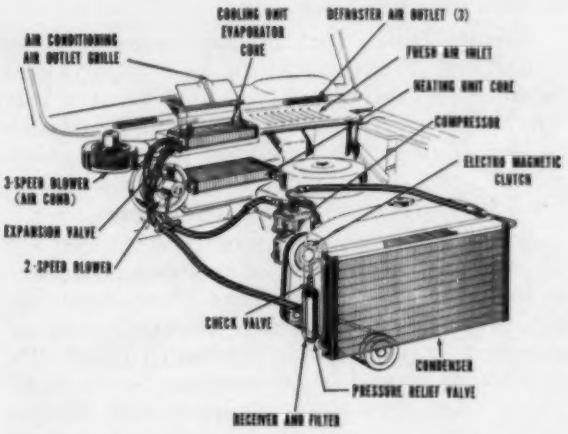
## American Motors . . . (Continued from page 16)

fornia regulations in which unburned fumes are recirculated through the carburetion system for complete combustion.

While retaining basic Ambassador lines there have been styling improvements in the new one-piece aluminum grille flanked by bold dual headlights. Parking and directional signal lights are located below the bumper in a recessed, protected position. The new tail lights are larger for increased




*Schematic illustration of Rambler's redesigned automotive air conditioning system.*

visibility and are contoured to the rear fender line. The rear deck lid is high and flat for maximum trunk space. There is a new, molded fibreglass ceiling panel which replaces the conventional sewn fabric type. This was a joint development of American Motors and Johns-Manville's Fibreglass Research Center. This panel, which is one-piece on sedans and 2-piece on station wagons, is designed to muffle airborne noises and vibration. It is strain resistant and completely fire-proof. It is made of compressed fibreglass insulation and molded glass trim fabric combined in a single unit lamination.

## Loose Ballast Resistor Connection Causes Rough Idle, Ignition Failure

According to a recent Valiant Service Information Bulletin, rough idling or engine stalling complaints are sometimes incorrectly diagnosed as a defective ignition switch when, in reality, the trouble is due to a loose connection between the wiring harness and the ballast resistor.

When the ignition key is turned to the "start" position, current flow is fed to the coil through the ballast resistor by-pass circuit, allowing the engine to start. After the ignition key is returned to the "run" position, current flow is fed through the ballast resistor.

With the ignition key in the "run" position, a loose terminal sets up resistance in the circuit and causes ignition failure. To correct the condition, increase the crimp on the female terminal until a positive connection is made between the male and female terminals.

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## Calendar of Automotive Events

**1960**

**Oct. 15-23—National Automobile Show,** Cobo Hall, Detroit, Mich.

**Oct. 24-27—1960 Fleet Maintenance Exposition,** New York Coliseum, New York.

**Dec. 2-9—Automotive Electric Association Annual Meeting,** Edgewater Beach Hotel, Chicago.

**1961**

**Feb. 14-15—Automotive Service Industry Assn. Convention,** Los Angeles, Calif.

**Feb. 16-19—Pacific Automotive Show-International,** Los Angeles, Calif.

**June 28-July 1—IGO National Convention,** Lowry Hotel, St. Paul, Minn.


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STO-FLO

Reduce fire hazard! Eliminate open pan draining of automobile gas tanks. Sto Flo Gas Kart adds safety and convenience to your service operation.

Drains, stores, filters and refills gasoline in a matter of seconds with no muss, or fuss, no splashing or spilling.

Available Direct to Dealers
Phone, Wire or Write

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Ward Manufacturing co
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Heart of the Loop in CHICAGO

- 1 Block from State Street Shopping
- Air-Conditioned
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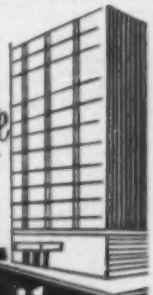
- 300 Modern Rooms
- Modest Rates from $5.75
- Guaranteed reservations with your FREE Hamilton Hotel "Preferred Guest" Credit Card — Write for yours today

Home of the Little Square RESTAURANT and COCKTAIL LOUNGE



HOTEL Hamilton
20 SOUTH DEARBORN

HE WHO LAUGHS, COME WHAT MAY,

WILL LIVE TO LAUGH ANOTHER DAY

# Short circuit smiles

Things you do just once—buy your boy a chemistry set. . . Agree to meet your wife downtown at 4:30 following her afternoon bridge. . . Offer to baby sit for nieces and nephews while your wife and her sister go on a shopping spree.

★ ★ ★

**Customer (having a rough shave): "Have you another razor?"**

**Barber: "Yes, why?"**

**Customer: "Well, let me have it. I want to defend myself."**

★ ★ ★

*A teacher was checking her students knowledge of proverbs.*

*"Cleanliness is next to what?"*

*A small boy replied with feeling: "Impossible!"*

★ ★ ★

**A tool grinders business is always good when things are dull.**

"Sam's slightly baffled. He sent the kid for a can of Blue Compression . . . and he came back with it!"

***Attorney: "Are you sure this is the man who stole your car?"***

***Plaintiff: "Well I was. Now I'm not sure I ever owned a car."***

★ ★ ★

**Umpire (pleasant and somewhat undersize): "Now, boys, let's have an understanding. Unpleasantness is the last thing I wish."**

**Tough Baseball Captain: "Any other last wishes?"**

★ ★ ★

A motorist once stopped at a filling station and inquired of the tall, seedy-looking man who appeared: "What community is this?"

The man looked puzzled and said: "What do you mean, 'community'?"

"Well," said the motorist, "a community is a place where people live together, work and play together, and do things together for the common good."

"Umph!" grunted the native. "This ain't a community. This here's a place!"

★ ★ ★

A workman was perched on top of a ladder cleaning the clock in the city hall when a nosey little old lady called up to him: "What are you doing there, young man—is something wrong with the clock?"

"No, no," he yelled down, "I'm just nearsighted!"

★ ★ ★

**When the newly weds boarded the train, their self-consciousness was obvious, but they tipped the porter not to disclose that they were just married. At breakfast the next morning, their fellow passengers greeted them with snide remarks and knowing glances. The groom jumped up from his seat and collared the porter.**

**"You got it wrong, Boss," the porter protested. "I didn't say you was married. When they asked me, I tole 'em you was jes' good friends."**

As her two teen-age sons walked across the backyard toward the garage, the mother leaned out the kitchen window and called, "You boys will have to double up with the convertible today. Your father broke the chain on his bicycle.

★ ★ ★

**A railroad engineer had just pulled the locomotive to a stop at the water tank and the fireman had stepped up on the tank to pull down the spout. His foot got entangled and he stepped into the tank of water. "Son," drawled the engineer, "just fill the tank you don't have to stomp it down."**

★ ★ ★

*A deaf old lady entered the church with an ear trumpet. As she was settling herself in her seat, an usher came over and whispered, "Listen, madam, one toot —and out you go."*

★ ★ ★

The Shop foreman to the Mechanic—Having trouble tuning that imported car? Answered the mechanic: "The way it acts I bet it was deported."

"I told him to shave that beard!"

A conceited bachelor was invited to a dinner by one of the town's leading society ladies, but didn't accept. Meeting her on the street a few days later, he said in his best manner, "I believe you asked me to dine with you last week."

"Yes, I believe I did," responded the lady. "Were you there?"

★ ★ ★

Sam, the barber, seemed a little jumpy, and it made his customer nervous. "Sam," he said, "what happens if you cut a customer? Does the boss get sore?"

"Yes, he does," Sam replied. "He makes us pay a dollar for every cut we give a customer—but I don't care, I had a good day at the races yesterday."

★ ★ ★

*A farmer who sent for a book on "How to grow tomatoes," later mailed a letter to the publisher complaining. "The man who writ the ad, shoulda writ the book."*

★ ★ ★

**Judge: "Do you challenge any of the jury?"**

**Defendant: "Well, I think I can lick that little fellow on the end."**

★ ★ ★

**Experience: Something that enables you to recognize a mistake when you make it again.**

# HERE'S WHY RAMCO MEANS SECOND GROOVE SUCCESS

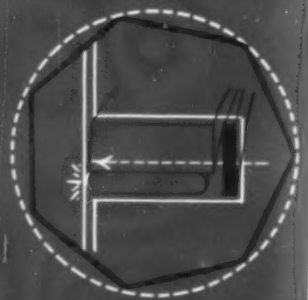
join the legion of modern mechanics . . . the men who know,

put **RAMCO *MODERN POWER* SUCCESS**

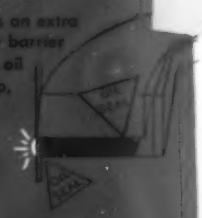
in all your ring jobs!

### "A COMBINATION COMPRESSION AND OIL RING"

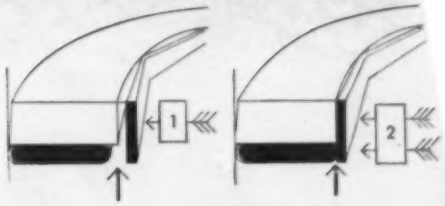
Inner ring is essential for compression control, piston stabilization. It equalizes ring and rail pressure after seat in, provides high continued conformability, least wall pressure.



CHROME RAIL is an extra oil ring — another barrier against blow-by, oil pressure build up, because it provides side sealing action.

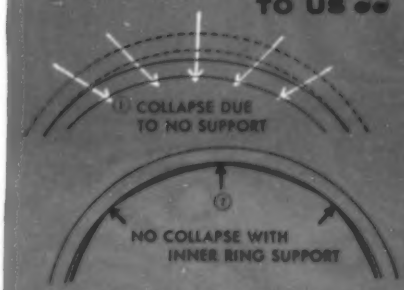


### "CLAIM OF LONG LIFE HOLDS UP"




Inner ring first centers its pressure against quick-seating cast-iron (1). After seat in, inner ring also contacts chrome rail (2), distributes pressure evenly over both for longer life.

### "VERY NECESSARY TO US"




① Ring collapse from oil pressure (hydro-dynamic) can occur at any point around the ring. Result: excess oil is allowed to go upward, finding its way to the combustion chamber.

② Ramco inner ring design prevents collapse by maintaining uniform outward pressure — not only at gap ends, but all around inside circumference. Result: continued compression contact and correct oil metering.

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another advance in THIN cylinder head gaskets

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SOLVES leakage and seepage problem on high compression engines

STOPS costly comebacks!

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